The

Geographical Journal

INCLUDING THE PROCEEDINGS OF THE ROYAL GEOGRAPHICAL SOCIETY.

PUBLISHED UNDER THE AUTHORITY OF THE COUNCIL.
EDITED BY THE ASSISTANT SECRETARY.

VOL. IV.—JULY TO DECEMBER, 1894.

LONDON:
THE ROYAL GEOGRAPHICAL SOCIETY, 1, SAVILE ROW;
EDWARD STANFORD, 26 AND 27, COCKSPUR STREET, CHARING CROSS, S.W.
1894.

PRINTED BY WILLIAM CLOWES AND SONS, LIMITED,
LONDON AND BECCLES.

ROYAL GEOGRAPHICAL SOCIETY.

PATRON.

HER MAJESTY THE QUEEN.

VICE-PATRON.

HIS ROYAL HIGHNESS THE PRINCE OF WALES, K.G., K.T., K.P., G.C.B., &c., &c.

Honorary Presidents.

HIS ROYAL HIGHNESS THE DUKE OF SAXE-COBURG-GOTHA, K.G., K.T., G.C.S.I., &c., &c.
HIS ROYAL HIGHNESS THE DUKE OF YORK, K.G.

COUNCIL

(ELECTED 28TH MAY, 1894).

President—CLEMENTS R. MARKHAM, C.B., F.R.S., F.S.A.

Vice-Presidents.

W. T. BLANFORD, LL.D., F.R.S., F.G.S.
Hon. G. C. BRODRICK.
Hon. GEORGE N. CURZON, M.P.
Sir JOSEPH HOOKER, K.C.S.I., C.B., F.R.S.
General R. STRACHEY, R.E., C.S.I., F.R.S.
Captain W. J. L. WHARTON, R.N., F.R.S.

Treasurer—EDWARD L. SOMERS COCKS.

Trustees—Right Hon. Lord ABERDARE, G.C.B., F.R.S.; Right Hon. Sir JOHN LUBBOCK, Bart., F.R.S., M.P.

Secretaries—H. SEEBOHM, F.L.S.; Major LEONARD DARWIN, R.E., M.P.

Foreign Secretary—Sir JOHN KIRK, K.C.B., G.C.M.G., F.R.S.

Members of Council.

Admiral LINDESAY BRINE.
ROBERT BROWN, M.A., Ph.D., F.L.S.
Lieut.-Colonel JAS. CECIL DALTON, R.A.
Right Hon. HUGH C. E. CHILDERS, F.R.S.
General W. H. GOODENOUGH, R.A., C.B.
Sir GEORGE D. TAUBMAN GOLDIE, K.C.M.G.
Major-General Sir F. J. GOLDSMID, K.C.S.I., C.B.
General Sir T. E. GORDON, C.B., K.C.S.I.
WILFRED HUDLESTON, F.R.S., F.G.S.
Lord LAMINGTON.
J. K. LAUGHTON.
GEO. SUTHERLAND MACKENZIE.
Admiral ALBERT HASTINGS MARKHAM.
JOHN MURRAY.
ERNEST G. RAVENSTEIN.
Sir RAWSON W. RAWSON, K.C.M.G., C.B.
HOWARD SAUNDERS, F.L.S., F.Z.S.
Admiral E. HOBART SEYMOUR, C.B.
Colonel H. C. B. TANNER.
Lieut.-Colonel J. K. TROTTER, R.A.
Colonel C. M. WATSON, R.E., C.M.G.

Assistant Secretary and Editor of Transactions—J. SCOTT KELTIE.
Librarian—H. R. MILL, D.Sc.
Map Curator—JOHN COLES, F.R.A.S.
Chief Clerk—S. J. EVIS.
Bankers—Messrs. COCKS, BIDDULPH and Co., 43, Charing Cross.

CONDITIONS OF FELLOWSHIP, &c.

Candidates for admission into the Society must be proposed and seconded by Fellows, and it is necessary that the description and residence of such Candidates should be clearly stated on their Certificates.

It is provided by Chapter IV., § 1, of the Regulations, that—

"Every Ordinary Fellow shall, on his election, be required to pay £5 as his "admission fee, and £2 as his first annual subscription, or he may compound, "either at his entrance by one payment of £35, or at any subsequent period on the "following basis:—

Fellows of	20	years'	standing	and	over	... ...	£12 10s.
"	15	"	"	and	under 20	...	£16
"	10	"	"	"	15	...	£20

"And no Fellow shall be entitled to vote or to enjoy any other privilege of the "Society so long as he shall continue in arrear."

All Subscriptions are payable in advance, on the 1st of January in each year.

The privileges of a Fellow include admission (with one Friend) to all ordinary Meetings of the Society, and the use of the Library and Map-room. Each Fellow is also entitled to receive a copy of all the Society's periodical publications. The *Geographical Journal* is forwarded, free of expense, to all Fellows whose addresses are known.

Copies of the Regulations and Candidates' Certificates may be had on application at the Society's Office, 1, Savile Row, London, W.

CONTENTS.

Authors are alone responsible for their respective statements.

No. 1. *July.*

PAGE

Address to the Royal Geographical Society. By Clements R. Markham, C.B., F.R.S., President 1
Obituary of the Year 26
Admiralty Surveys 26
Geography at the Universities 29
The Survey of India, 1892–93. By C. E. D. Black 31
The Italian Monument to Columbus. By Clements R. Markham, C.B., F.R.S. 33
The Geography of Mammals. By W. L. Sclater, M.A., F.Z.S. 35
Note on the R.G.S. Map of Tibet. By General J. T. Walker, R.A., C.B., F.R.S., Late Surveyor-General of India 52
The Recent Territorial Arrangements in Africa. By E. G. Ravenstein 54
The Monthly Record 58
Meetings of the Royal Geographical Society 70
Geographical Literature of the Month 83
New Maps 93

Maps and Illustrations.—Map to illustrate the Anglo-Congo Arrangement 55
Map to illustrate the Anglo-Italian Arrangement 57
Geography of Mammals. Map of the Australian Region 96
Tibet and the Surrounding Regions. Compiled from the latest information 96

No. 2. *August.*

Peoples, Places, and Prospects in British East Africa. By C. W. Hobley, Assoc. M. Inst. C.E. 97
Wanderings in the Hinterland of Sierra Leone. By T. J. Alldridge 123
The Jackson-Harmsworth Polar Expedition. By F. G. Jackson 141
Recent Geographical Work by the United States Geological Survey. By Marcus Baker, of the United States Survey 147
The Island of Engaño. By Dr. F. H. H. Guillemard 153
Reclus' 'Universal Geography.' By Halford J. Mackinder, M.A. 158

PAGE

A View of Ormus in 1627. By William Foster 160
The Landslip at Gohna, in British Garwhal 162
The Monthly Record 171
Obituary 179
Correspondence 180
Meetings of the Royal Geographical Society 183
Geographical Literature of the Month 183
New Maps 191

MAPS AND ILLUSTRATIONS—View of Mount Kenya from Camp in North-East Kikuyu 111
Map of the United States 151
Ormus in 1627 160
Topography of the Valley of Gohna 164
Plan of the Gohna Lake 165
Cross-Section of Landslip 166
Plan and Longitudinal Section of the Dam formed by the Gohna Slip 167
Plan of River below the Lake, showing Probable Danger during Flood to Bridges and Towns 169
Map showing Mr. Alldridge's Routes in the Hinterland of Sierra Leone 192

No. 3. *September.*

Kafiristan. By G. S. Robertson, C.S.I. 193
On the River Telubin. By Henry Louis, A.R.S.M., F.G.S., etc. 219
A Survey of the English Lakes. By Hugh Robert Mill, D.SC. 237
Dr. Baumann's Journey through East Africa. By E. Heawood 246
Dr. G. M. Dawson's Observations on the Bering Sea 250
The Physical Condition of the Ocean. By Captain W. J. L. Wharton, R.N., F.R.S. 252
Morphometry of the Lake of Constance 264
The Geographical Distribution and Habits of Whales. By Professor C. Möbius 266
The Monthly Record 268
Correspondence 276
Geographical Literature of the Month 279
New Maps 285

MAPS AND ILLUSTRATIONS.—Map of Kafiristan 288
Map of the Telubin and Patani Valleys 288

No. 4. *October.*

Contributions to the Physical Geography of British East Africa. By J. W. Gregory, D.SC., F.G.S., of the British Museum (Nat. Hist.) 289
Expedition to the Hadramut. By J. Theodore Bent 315
The Voyage of the *Jason* to the Antarctic Regions. Abstract of Journal kept by Captain C. A. Larsen 333
Physical Conditions of the Clyde Sea Area. By Hugh Robert Mill, D.SC., F.R.S.E. 344
Mr. Scott-Elliot's Expedition to Mount Ruwenzori 349

PAGE

The Sugar-Loaf Mountain, Mozambique. By William A. Churchill, H.B.M. Consul at Mozambique 352
Geography at the British Association, Oxford, 1894 355
The Monthly Record 358
Obituary 370
Geographical Literature of the Month 374
New Maps 382

MAPS AND ILLUSTRATIONS.—Diagrammatic Section of British East Africa .. 297
Views of S. Iveti Mountains 303
Al Khollon 323
Hajarein 325
Sketch Chart showing Captain C. A. Larsen's Track in the *Jason*, 1893–94 333
A Map Illustrating a Journey to Mount Kenya and Lake Baringo 384
Map of Hadramut 384

No. 5. *November.*

Montenegro and its Borderlands. By W. H. Cozens-Hardy, M.A. 385
Contributions to the Physical Geography of British East Africa. By J. W. Gregory, D.SC., F.G.S., of the British Museum (Nat. Hist.) 408
The Anglo-German Boundary in East Equatorial Africa. Proceedings of the British Commission, 1892. By Consul C. S. Smith 424
An Expedition through the Barren Lands of Northern Canada. By J. Burr Tyrrell, M.A., B.SC., F.G.S. 437
The Historical Geography of the Holy Land. By Coutts Trotter 450
The Exploration of Iceland 453
The Monthly Record 455
Obituary 464
Correspondence 465
Geographical Literature of the Month 467
New Maps 476

MAPS AND ILLUSTRATIONS.—A Montenegrin Village 387
The Kom Range, from Maglić 393
Andrijevica 395
Biogradsko Lake 396
Longonot looking west from the Summit of the col to the E. 409
Settima from the East: seen from the Steppes N. of the Guaso Nairotia and N. of Camp 73 422
Sectional Diagrams of British East Africa .. 423
Map of the Anglo-German Boundary in East Africa 435
Sketch-Map of Montenegro, Albania, and Novibazar 480
Map of Northern Canada 480

No. 6. *December.*

PAGE
The Bakhtiari Mountains and Upper Elam. By Lieut.-Col. H. A. Sawyer .. 481
Contributions to the Physical Geography of British East Africa. By J. W. Gregory, D.Sc., F.G.S., of the British Museum (Nat. Hist.) 505
The Dæmme Vand, or Rembesdal Glacier-Lake, Norway. By Captain A. F. Mockler-Ferryman 524
Dr. Donaldson Smith's Expedition in Somaliland 528
The Peary Auxiliary Expedition, 1894. By Henry G. Bryant 531
Our Commercial Relations with Chinese Manchuria. By A. R. Agassiz .. 534
China, Japan, and Korea. By Baron F. von Richthofen 556
The Monthly Record 561
Obituary 572
Correspondence 574
Meetings of the Royal Geographical Society 574
Geographical Literature of the Month 575
New Maps 581

MAPS AND ILLUSTRATIONS.—First View of Bakhtiari Land 482
The Shamsabad Defile 483
View of the Zard Range 485
The Source of the Karun 486
The Karun River 487
Bridge over Darkash Warkash 488
Abi-i-Zarin 489
The Basnoi Valley 494
The Haft Tanan Snow-peak 497
The Gandaman Valley 499
Diagrams showing views of relations of head streams of the Tana and Athi 509
Alpine Flora of East Africa 511
Sketch-Map showing probable original source of the Nile and outlet of the drainage of the Nyanza group of lakes before formation of gorge through the Latuk mountains .. 513
Panorama of the Dæmme Vand region 525
Dr. A. Donaldson Smith's Route in Somaliland 529
Reconnaissance Survey of the Bakhtiari Country. By Lieut.-Col. H. A. Sawyer 584

The
Geographical Journal.

No. 1. JULY, 1894. Vol. IV.

ADDRESS TO THE ROYAL GEOGRAPHICAL SOCIETY.*

By CLEMENTS R. MARKHAM, C.B., F.R.S., President.

In delivering my anniversary address for the first time as your President, it is with a feeling of intense satisfaction that I am able to do so after all old wounds have been permanently healed over, and after perfect harmony has been restored in the Society. It was found last year that the rules did not all work so as to give complete satisfaction either to the Council or to the rest of the Fellows, and some deplorable friction was the result. This has now been remedied. The privileges and rights intended to be enjoyed by the Fellows under the charter have been fully and clearly secured to them by the rules; all possibility of contentious discussion and debate has been entirely banished for the future from our anniversary meetings; and special general meetings will not be called without more ample notice than has hitherto been given, while requisitions for them will be made, and resolutions will be passed by a more adequate number of Fellows. These alterations in the rules were called for by the general sense of the Fellows. They have removed all feeling of dissatisfaction that lingered amongst us. It will be my aim, as your President, to maintain the harmony which happily now exists by keeping the Fellows acquainted with the decisions of the Council affecting the well-being of the Society, and by using every effort to prevent friction, and to promote, and if possible to increase, the interest taken in the Society's work by the individuals who compose it.

I have long entertained the idea that these desirable objects might be secured, among other ways, by a plan which, with much help and

* Delivered at the Anniversary Meeting, May 28th, 1894.

advice from members of the Council and from the Society's staff, is now nearly matured. I have drawn up a list of all the Fellows who have written papers for our Proceedings or Journal, or have published books, or are known to have a special knowledge of one or more departments of our science, and to this list additions have been made by others. For the present I have called it a List of Referees, because papers or questions can advantageously be referred for report to any of the Fellows contained in the list, as regards their special subject or subjects. It is divided into two parts, the first being an alphabetical list of names with the subjects respecting which each is an expert; and the second being arranged according to countries and subjects. It will be sent to many Fellows of the Society for suggestions and additions, and, when tolerably complete, it will probably include several hundred names. Some Fellows are collectors of geographical books or maps. Others may have a profound knowledge of particular regions, or of special departments of our work, who have never published anything. The referees may have papers referred to them, may become members of committees on questions relating to their special subjects, and would, no doubt, be ready to give information and advice to inquirers, while the Council will be mainly recruited from them. The existence, and eventual publication, of the List of Referees will be of use to the general body of Fellows in various ways. Taking a more general interest in geographical subjects, the elders will thus be informed whither to go for information on points that occupy their attention, while it will be the ambition of younger members to qualify themselves for inclusion in the list. In various ways I confidently hope that the plan will have the desired tendency of drawing the Fellows more together, and into nearer touch with the Council.

Another measure, which I anticipate will have a similar effect, will be to offer more inducements to study and make use of the great store of geographical information in our library, by the completion of the catalogues, and by giving greater convenience and more comfort to readers. The present alphabetical catalogue was made in 1865, and there have been two supplements in 1870 and 1880. But in 1893 it was decided to recast the whole catalogue, including the three supplements (for a third up to 1890 had been prepared and was ready for printing), and to make one continuous alphabetical catalogue, printed in smaller type than previously and in double column, and brought down to 1893. It is now all in print. There will be two Appendices, the first containing an alphabetical list of all the collections of voyages and travels, with an analytical table of contents to each volume, which is also in type. The second Appendix is devoted to anonymous and periodical literature arranged in geographical order. The catalogues have been made under the control and superintendence of Dr. Mill. The assistant in the library, Mr. Vincent Hawkins, deserves great credit for his

industry and diligence, and Dr. Murie has now put the series of periodicals into perfect order, making a list of all deficiencies; but the second Appendix is not yet finished. The authors' catalogue will, however, be in the hands of the Fellows in the course of the present year.

A subject catalogue was prepared by Mr. Godfrey Evans in 1871, and was extremely useful, but it now contains less than half the books in the library. In 1892 it was, therefore, resolved that a new and exhaustive subject catalogue should be prepared, and the services of Dr. Murie were secured, to work at it under the control of Dr. Mill. He has since given the Society the benefit of his remarkably wide knowledge of geography and travel, and of his rare perseverance and organizing ability. The three essentials of this catalogue are that it is to be exhaustive, systematic, and exclusively geographical, many works in the library that are not geographical appearing only in the authors' catalogue. A subject catalogue fulfilling these conditions will be an invaluable contribution to geography, serving as a guide to all workers in all parts of the world, as well as rendering the contents of the library accessible to Fellows. It involves enormous labour. All the titles of books and pamphlets in the printed catalogues, numbering 18,000, have been cut out and classified; and all transactions and periodicals have been rearranged. Dr. Murie calculates that the number of titles of papers in periodicals will amount to 84,000; so that the complete catalogue will comprise about 110,000 titles, occupying 5000 octavo pages of print. Dr. Murie is now put upon his metal to complete the work in not more than two years.

Dr. Mill gave a new form to the bibliography in the Journal when it was commenced last year. It was made to include not only books and separate pamphlets, but all the longer geographical papers which appeared in the periodicals received in the library. Thus an analysis of current geographical work is presented each month. From these notices a subject card catalogue has been compiled since June, 1892, divided into continents and subdivided into countries and provinces, the arrangement being assisted by the use of differently coloured cards. As it is kept up to date, this card catalogue forms an appendix to the great subject catalogue.

As soon as the alphabetical catalogue is finished, I intend to establish two *desiderata* books—one for Fellows to enter any book they may have asked for, which is not in the library; and the other to contain a complete list of works which are wanting to make our library perfect.

I am very anxious that the accommodation for readers should be improved, and that they should be made more comfortable, in order that their numbers may increase, and that more use may be made of the library. Several suggestions have been made with this object in

view from time to time; and now the question of either improving and enlarging the accommodation in our present house, or of buying other premises, is occupying the very serious attention of the Council. Momentous financial and other questions are involved, and the subject is one which calls for most careful consideration. It will not be decided hurriedly, and no irremediable step will be taken without the consent of the Fellows of the Society assembled at a special general meeting. At the same time a final decision is rather pressing, as all the work is kept in an unsettled state until it is known whether we are to remain in our present house or to go elsewhere. For instance, the press marking of the books in the library cannot be proceeded with until it is known on what shelves they are to rest. The Fellows may be assured that our deliberations will be full and mature, that we shall seek the best advice, and that our final decision on this subject will be the best that can be made under the very difficult circumstances, when there are so many things for and against any course we can adopt.

The *Geographical Journal*, in its present form, has now completed the first eighteen months of its existence, and we may claim for it that it has more than fulfilled the expectations that were entertained of it. We now receive every month the papers read at our evening meetings, with good and original maps, with the discussions and often with illustrations, papers on scientific and on applied geography, carefully selected and classified notes on matters of general geographical interest, notices of the literature and cartography of the month, obituaries, and news. I find that already our Journal has attained a fair share of success. The sale to the outside public has increased considerably, and the importance of our publication may be gauged, to some extent, from the fact that the advertisements have increased from four to an average of twenty-two pages. This is important, because it helps the Journal, in its new form, to pay for the expense of its production. The fact that it is quoted everywhere, at home and abroad, may be taken as a sign that it has already been recognized as the leading organ of geography, at least in the English language. From the beginning it has been favourably noticed by the principal organs of the press. But I consider that the most gratifying testimony to the enterprise of our Society in this and other directions is contained in a letter from the celebrated traveller and geographer, Baron von Richthofen. "Will you allow me," he wrote, "to make use of this opportunity for congratulating you on the excellent character of the *Geographical Journal*?" As far as our means permit, we shall endeavour to improve its character and attractions. We have subscribers, outside the Society, in all parts of the world, in remote towns in the United States, and in Australia; and steps will be taken to bring the Journal under the notice of hundreds likely to be interested in it, both in America and the Colonies. The size of our publication will probably have to be increased before long; for even with the extra

pages which have been added, our accomplished Editor finds it increasingly difficult to keep pace with geographical activity in all departments and in all parts of the world.

We thus have, in our Journal every month, a very complete review of geographical proceedings throughout the world, and every six months six journals are presented to us with an index. The review of these Proceedings, which it has been customary for former Presidents to give in their annual addresses, has therefore become unnecessary, for the Fellows will already be in possession of such a review, and another recapitulation is neither useful as information nor serviceable for future reference. It is work already well done. It seems desirable, therefore, as likely to be more interesting to the Fellows, that the main part of the address should in future dwell upon some particular subject, preferably one that has most engaged the attention of geographers during the past year.

I freely acknowledge that the omission of a detailed review of the progress of geography will be quite a new departure, for such a review has annually been given since the foundation of the Society. For many years it was essential, because the information could not be found elsewhere, and for a long time it was very useful; but as it has now become unnecessary, owing to the improved character of our Journal, the time for a change, in the place of the annual address, seems to have arrived. During the first eight years of our existence, the reviews of geographical progress were written by our indefatigable naval secretaries, Captains Maconochie and Washington. But in 1838 my accomplished predecessor, Mr. W. R. Hamilton, introduced the practice of delivering annual Presidential Addresses, which has ever since prevailed. Since 1838 there have only been three occasions on which the annual address has not been written and delivered by the President. In 1861 Sir Roderick Murchison, as Vice-President, delivered the address in the absence of Lord Ashburton; in 1879 I delivered the address as Secretary, owing to the absence of Lord Dufferin; and the illness of Lord Aberdare made it necessary for General Strachey to deliver the address in 1886. It was the custom for the obituaries, which now appear in the different numbers of the Journal, to be collected in the address; and there was a detailed review of work done during the year. I may observe that the address was always entitled "Address to the Royal Geographical Society by the President," from 1838 to 1878. In 1879 I prepared a statement of the progress of geography during the year, in lieu of a President's address, and ever since my title has been adopted, and the President's address has been called "The Annual Address on the Progress of Geography." But that title was not intended for the President's Address. I now propose to revert to the older and more convenient title, "Address to the Society by the President," leaving each President freedom to choose his own subject-matter.

For it was not the plan of Mr. Hamilton that the addresses should be confined to obituaries and reviews of current work, as has generally been the case in recent times. He and his immediate successors, while following the established practice, also dwelt upon some special subject in the body of their addresses. In 1838 Mr. Hamilton discoursed on the importance of geography, and on the uses of the Society; and in 1839 his great numismatic knowledge enabled him to offer some most interesting suggestions respecting our medals. Mr. Greenough occupied his address with a treatise on map-drawing and an improved system of mapping. Admiral Smyth dwelt on the duties of the Society, and on the definition and scope of geography. Sir Roderick Murchison made it a regular practice to select some subject of interest as the principal feature or kernel of his addresses. In 1844 this was the Ural mountains and the gold-produce of Russia. In 1852 he sketched out, with a master hand, the geographical features of the African continent. Oceanography, suggested by Maury's charming work, was the subject of Sir Roderick's address in 1853. In 1857 he stirred his audience to enthusiasm by his advocacy of a final Arctic search; and in the following year he dwelt on changes of the Earth's surface. Earthquakes were his subject in 1859, the former condition of Europe in 1863, and glaciers in 1864. In 1865 he reviewed the work remaining to be done in all parts of the world. The address of 1867 was devoted to the Aralo-Caspian Basin, and Sir Roderick's later addresses were occupied with the connection of geography with geology. After Sir Roderick's time the practice of giving a kernel to the Presidential addresses was abandoned, until in 1888 General Strachey touched upon the legitimate limits of geography, and in 1889, on the occupation of the waste spaces and on the supremacy of civilized races.

The idea of devoting the bulk of the Presidential Address to one special subject of interest is not, therefore, an innovation, for it was the almost invariable practice of Sir Roderick, and had been occasionally adopted before his time. As the ordinary subject of former addresses is now adequately provided for every month in the Journal, a mere recapitulation can serve no useful purpose. The fare that should now be served up to the Fellows is a kernel in imitation of Sir Roderick's *menu*, with such garnishing as time and circumstance may suggest, and as each President may think desirable. Such is my ideal of the Presidential Address of the future; but I am unable to entertain the hope that I can make even an approach to its realization. I will, however, take this opportunity of dwelling upon the subjects which have chiefly occupied geographers during the past year, namely, the promotion of further discovery both in the Arctic and the Antarctic Regions.

No less than six expeditions have either been projected or undertaken to explore different parts of the Arctic Regions within the last two years, so that the subject has necessarily occupied a large share of

our attention. It is one that has been before this Society since its foundation, and some of the most important Government expeditions, including that of Sir George Nares in 1875, were due to the initiative of our Council. In the long period, during which Arctic work has been over and over again under the special consideration of the Council, and of Committees appointed by it, consisting of men of science and of varied Arctic experience, distinct canons of exploration have been laid down, and opinions have been formulated which will certainly be useful for our guidance in the future. The Council has always consistently maintained that merely to reach the North Pole, or to attain a higher latitude than some one else, were objects unworthy of support. In our view, the objects of Arctic exploration are to secure useful scientific results: in geography, by exploring the coast-lines and interiors, and by ascertaining the conditions of land and sea within the unknown area; in geology, by observations and collections; in zoology and botany; and in physics, by a complete series of observations, extending over at least a year. I well remember that when, in 1874, we were preparing the memorandum on the scientific results of Arctic work, General Strachey added another consideration. It may be shown, he said, that no such extent of unknown area, in any part of the world, ever failed to yield results of practical as well as of purely scientific value; and it may safely be urged that, as it is mathematically certain that the area exists, it is impossible that its examination can fail to add largely to the sum of human knowledge.

The unknown area remains very much as it was left when these words were written in 1874, except that the expedition of Sir George Nares, in the two following years, discovered the trend of the land on the eastern and western sides of Robeson Channel, the great extent of the sea of ancient ice, and brought back valuable collections and observations in all branches of science. We are still ignorant of the region to the north of Siberia. The northern, western, and eastern sides of the archipelago of Franz Josef Land have yet to be explored. The problem is still unsolved whether there is land due north of Spitzbergen. We have yet to hear whether the outline of Greenland has been completed. Ellesmere Land is almost entirely unknown, as well as the important and interesting region leading from Jones Sound. The whole vast region between Prince Patrick Island and Siberia, the exploration of which will lead to such important results in physical geography, is also unknown. The whole of this work can only be accomplished gradually, and one expedition will have to follow another until all the knowledge attainable in this field of inquiry has been secured.

For achieving success we have held certain canons, the correctness of which has been confirmed by all experience. It is true that they may be neglected on rare occasions without fatal consequences, but this can very seldom be done with impunity. The first great lesson taught

by two centuries of experience is that no extensive and useful exploring work can be calculated upon by merely entering the drifting pack. Secure progress can only be made by following a coast-line. The second canon is that at least one winter must be passed at a point beyond any hitherto reached. This is essential in order to obtain series of meteorological and magnetic observations of any value. The third rule is that a ship, not a hut on shore, must be looked upon as the proper base of operations, sledges being the main instruments for exploration and discovery. Thoroughly good work, including complete series of observations of all kinds, can only be secured by the appliances and resources of well-equipped Government expeditions. When the conviction of the importance of that part of the duty of a Government is absent, which is unfortunately the case during long intervals, private enterprise has always been ready to enter the breach, though with inferior resources, and therefore at greater risk. The commander of an Arctic expedition ought to be a man of high scientific attainments, of great experience in the ice, and known to be gifted with the rare qualifications of a leader of men. Such a commander is seldom to be found except in the service of a Government with a wide range of selection. When the circumstances and qualifications that we would desire to secure are unattainable, then we gladly welcome the nearest approach to them. Enterprise, however contrary to rule and however audacious, should ever be encouraged and cheered onwards. When there are only small resources, risks must be run and attempts must be made which could not be approved under other circumstances. We shall always admire and applaud the enthusiasm and temerity of those who make attempts to open geographical secrets by private enterprise and with inadequate means. It is under such conditions that the projects have been conceived, and in some cases matured, which have engaged our attention in the Arctic Regions during the last two years. The merit of the work that may be achieved will be immensely enhanced by the special difficulties arising from different causes in each case, but all increasing the risk and the glory.

In Nansen the expedition to the north of Siberia has the unusual advantage of having a commander of high scientific attainments, considerable Arctic experience, and the rare gift of inspiring confidence among his followers. As is well known, his guiding idea is that, as all previous expeditions have been stopped by the ice drifting south, he would not be stopped if he entered the Arctic Regions in the ice stream drifting north. He thus discards our chief Arctic canon, which is that progress should always be made along a coast-line; but the application of that rule has always been to ice drifting in a direction contrary to the course of the ship. It seems very doubtful whether the initial force of the current on the Siberian side of the Polar sea will be sufficient to carry the *Fram* into the strong stream which

undoubtedly flows south between Spitzbergen and Greenland. Her drift, however, may be in the direction that is anticipated by her sanguine and very able commander, and it is almost certain that there is an ice-laden channel, unobstructed by extensive land. We have no intelligence of the expedition having reached the neighbourhood of the mouth of the Lena, and it is possible that the *Fram* may have been beset in rounding Cape Chelyuskin, or even earlier. In that case it is likely that land will be discovered, which will certainly diminish the dangers of the pack. Wilczek Land may extend for a great distance to the east. The water to the east and west of the most northern point of Siberia is deeper than that directly to the north, which seems to indicate the existence of land north of Cape Chelyuskin, and it is not unlikely that the *Fram* will have fallen in with it. In that case Nansen will doubtless seek its northern limit, and thence endeavour to get into the northerly drift. Under any circumstances, he is sure to accomplish a great deal of valuable scientific work, and to make important discoveries. Of that we may be quite confident; and I am glad to think that Nansen concurs in the maxim of our Council, that the principal aim of Arctic voyages should be to explore the unknown regions, and not merely to reach the Pole. Lieutenant Weyprecht writes even more strongly. "The key to many secrets of nature," he says, "the search for which has now been carried on for centuries, is certainly to be sought for near the Poles. But as long as Polar expeditions are looked upon merely as a sort of international steeplechase, and their main object is to exceed by a few miles the latitude reached by a predecessor, those mysteries will remain unsolved."

The scene of Weyprecht's scientific observations, and of Payer's interesting and ably conducted sledge-journey, was Franz Josef Land, which is certainly the most promising starting-point for further discovery. This land, discovered by the Austrian expedition in 1872, consists of an archipelago, the southern shores of which are as far north as 80°, while the most northern land seen is in 83°. It will be remembered that Franz Josef Land consists, besides smaller islands, of two masses of land of sufficient extent to bear discharging glaciers sending forth flat-topped icebergs, which apparently drift northwards. Between these two masses, called Zichy and Wilczek Lands, is the channel named Austria Sound, which was explored for a considerable distance by Payer in the months of March and April, by means of sledges drawn by men, assisted by three dogs. All the low islands, as well as the main masses of land, were found to be covered by glacial caps. The remarkable fact connected with this journey is that, from Payer's furthest point in 82° 5′ N., a water sky made its appearance in the north, the temperature rose, and the rocks were covered with thousands of auks and guillemots. From a height Payer looked down on a dark sheet of open water dotted with icebergs. On April 12 the thermometer was at 54° Fahr. These

phenomena so early in the year are most exceptional, and point to an abnormal condition of things, the causes of which it would be of the utmost importance to discover. Possibly they betoken the navigability of the Polar sea in this direction at certain seasons, although it is true that Payer's open water was only a "polynia," and was surrounded by old ice. In 1880 Mr. Leigh Smith, in the *Eira*, reached the southern shore of Franz Josef Land, and succeeded in rounding the western headland, whence the land trended in a north-westerly direction.

Judging from the birds and open water in 82° N. as early as the month of April, and from the success of Mr. Leigh Smith's voyage in 1880, it was considered by all who were capable, from their Arctic experience, of forming a judgment, that the proper way to explore the northern part of the Franz Josef Archipelago would be by despatching a well-equipped vessel along the western coast. It was the maxim of the Baffin's Bay whalers to "stick to the land floe," and to this Sherard Osborn added, "Stick to the western shore." I strongly advocated the despatch of such an expedition at a meeting of this Society on December 9, 1878, and my views were endorsed by several high Arctic authorities. A vessel well handled would certainly reach the threshold of the unknown, and would probably establish a base on the west shore of King Oscar or of Petermann lands, whence extensive and most important discoveries would be made in the spring. This, no doubt, is the most promising way of attempting the exploration of one of the most important sections of the unknown Polar region, and I believe that it will be undertaken the next time the British people wake up from their lethargy and become alive to the national importance of Arctic work. This happens about every thirty years.

Meanwhile we welcome the enterprise of Mr. Harmsworth and Mr. F. G. Jackson, which is directed towards the Austria Sound of Payer. It is highly to the credit of Mr. Harmsworth that he should have determined to provide the funds for a laudable geographical undertaking. It reminds one of the patriotic munificence of the merchant princes of old, and of Sir Felix Booth in more recent times. Mr. Jackson has made a voyage in a whaler, and last year he went out with Captain Wiggins to Waigats Island, where he was landed. He then made an excursion round the island with some Samoyeds, returning by Archangel; these sledge-journeys being undertaken in order that he might acquire experience for his future work. His plan is to be landed at Eira harbour, or at some other convenient point on the southern shore of the Franz Josef Archipelago. For this purpose a whaler named the *Windward* has been purchased. She will land the party of six men, and return without wintering. A house brought out in pieces will be erected, and the explorers will pass the winter in it, in order to be ready for a spring journey up Austria Sound in the footsteps of Payer. The chief drawback to the plan is that so much

of the travelling will be over old ground already well explored by the Austrian expedition; so that the base of operations will be at least 160, and if at Eira harbour nearer 200 miles, from the point reached by Payer, where Mr. Jackson's work will commence. It does not appear how a second winter quarters can be established, with a sufficient stock of provisions, at the furthest point reached. It will therefore be necessary to return to the original base of operations, and to start again over all the same ground, in the second spring. A well-considered system of depôts would render this second journey more rapid if the explorers maintain their healths, and with a good team of dogs much ground might be covered. The most fortunate thing that could happen would be to find Austria Sound open, so that the *Windward* or a steam pinnace could convey the explorers northwards to within a shorter distance of their work. Austria Sound is not the route I should have recommended for reaching Petermann Land; but, with wise management and under favourable conditions of ice and weather, a good measure of success is quite possible. The Council is desirous of giving Mr. Jackson all the encouragement and assistance in its power, and we heartily wish him all the success that is attainable with the means at his disposal.

Westward the archipelago of Spitzbergen ends in the parallel where that of Franz Josef commences. It has long been a favourite idea with inexperienced theorists, that the pole might be reached by a ship shaping a northern course through the ice to the north of Spitzbergen. This idea transgresses the best established of our Arctic canons, which is never to enter the drifting pack away from land. But it occurred to Sir Edward Parry that, although the impracticability of sailing to the pole by the Spitzbergen route was sufficiently proved, the same object might be attained by travelling with sledges over the ice. Parry undertook this feat in 1827, with two flat-bottomed boats 20 feet long, with runners on each side of the keels shod with metal; so that the boat entirely rested on the runners when on the ice, and became a sledge. They started with seventy-one days' provisions, and on June 23 the boats were hauled on the ice in 81° 13′ N. The weight of each boat with provisions was 3753 lbs., or 268 lbs. per man, there being twelve men and two officers for each boat. The ice-floes were found to be of small extent, and intersected by high ridges of hummocks, the snow was soft and heavy, and there was much water lodged on the floes. But the southerly drift exceeded four miles a day; the advance north under such circumstances was hopeless, and Parry resolved to retrace his steps on July 23, when he was in 82° 45′ N. From this point there was a strong yellow ice-blink overspreading the northern horizon, and showing that the polar pack extended far to the northward. Parry's great mistake was in starting so late in the year. He ought to have been at least two months earlier. The daily

allowance of food was insufficient, and the weight to be dragged, of 268 lbs. per man, was far too great.

Undoubtedly, if these errors were avoided, a much further advance to the northward might be made under favourable circumstances. The object of such an expedition would be to get further north than anybody else—"to beat the best record;" a motive which was so earnestly deprecated by Lieutenant Weyprecht, as the bane of good Arctic work. Still it is a sporting thing to attempt, and as those who are engaged in it will acquire valuable experience in the ice, it deserves every encouragement. Mr. Walter Wellman, a journalist of Washington, with funds amounting to £4000, has undertaken to make a renewed attempt to attain a very high latitude north of Spitzbergen, and has already started on his adventurous undertaking, with a few carefully chosen assistants. He is a capable and resolute man, and a thoroughly well-planned effort will be made under his auspices. He will land on Dane's Island, near the north-east angle of Spitzbergen, in the present month. Thence he will push northwards in aluminium boats of a new design, constructed at Baltimore, and weighing only 450 lbs. each. The boats are 18 feet long, 6 in beam, and 2 feet deep amidships, and are intended for a crew of nineteen men. They contain no frames, the gunwale, thwarts, knee-braces, and watertight compartments at either end giving the necessary rigidity; but too much rigidity is undesirable, elasticity serving to cushion the blows of the ice, and to transmit the force of the concussion through the whole structure. The keel is a plate of aluminium, and the plates are riveted together clinker-fashion, and are only a tenth of an inch thick. Two ash runners are fitted on the boat's bottom so as to convert it into a sledge, and a sheet of aluminium is riveted to the outer sides of both so as to form a broad surface for running on the snow or ice. It is doubtful how this kind of runner will work, but the lightness of the boats will be an incalculable advantage, and Mr. Wellman ought to advance far beyond Parry, especially if the dogs prove to be of use. If there are islands beyond 83° N. on the Spitzbergen meridians, and he is able to explore them, his expedition will be of great service to geography; but if not, very little benefit can be derived from a journey over the ice-floes in Parry's footsteps.

The enterprise of Lieutenant Robert E. Peary in Northern Greenland is of the greatest geographical importance. It is designed to solve the question of the insularity of Greenland—one of the oldest that remains for solution, and not the least interesting. It is a great achievement to put the finishing touch to the long tale of heroism and constancy which relates the discovery of the outline of that vast glacier-bearing island. The romantic story of the Norsemen is succeeded by the splendid work of Davis and Baffin, followed by the voyages of Ross, Inglefield, Kane, Hayes, Hall, and Nares, and by the sledge-journeys of Beaumont and Lockwood. These dauntless explorers completed what we know of the

western side. On the east side the boat-journeys of Graah, Holm, and Ryder have been connected with the discoveries of Scoresby and Clavering, and the German expedition of Koldewey named the most northern point they saw on the east coast after Prince Bismarck. It is Peary's noble ambition to connect Cape Bismarck with the furthest point reached by Lockwood; and he resolved to make the attempt from the western side, by one of the most remarkable, if not the most remarkable journey ever made over an unbroken glacier.

Peary is a native of Maine, aged about forty, and an engineer in the United States navy. He is a man who appears to be cut out for such work, combining forethought and prudence in planning his operations, with great skill and the most undaunted resolution in carrying them into execution. His first expedition in 1891–92 was tentative, but it was a great success. He went out in the whaler *Kite*, and was landed in McCormick Bay in 77° 43′ N. on the northern side of Inglefield Gulf (the Whale Sound of Baffin), the party consisting of seven persons, including Mrs. Peary. Peary had his leg broken during the voyage, and was in a helpless condition when he was landed. His complete recovery was due in no small degree to the unremitting care of his wife. We must all feel the greatest admiration for the devotion of this lady, who braved the rigours of the Arctic regions, and was not only the life and soul of the winter quarters, but was throughout a most useful member of the expedition. The house was conceived and erected in a workmanlike manner, and in all Peary's operations there is the evidence of capacity and skill. He studied the questions of clothing, of provisions, and of sledge weights with great care and good working results. He also tried the different kinds of sledges before finally deciding that McClintock's pattern was the best. His journey occupied eighty-three days, from May 15 to August 6. The start was made with four sledges, four men, and dog teams, the depôt sledge with two men returning from Humboldt Glacier. Peary, with his companion Astrup, proceeded with three sledges and the dogs, and was travelling forty-eight days before reaching the northern edge of the great glacier, the actual marching time being forty days, and the distance covered 650 miles, or 16¼ miles a day. They had no depôts, and all the food was carried on the sledges, except two musk oxen and a calf shot on the north-east coast. The return journey of 600 miles occupied only twenty-eight days. Peary started with twenty dogs, reached his extreme point with fifteen, and returned with five. A good Eskimo dog will drag 100 lbs. at the rate of 10 to 20 miles a day.

It was found that, in approaching the edge of the glacier towards the north, the travellers got involved among numerous crevasses, causing endless trouble to circumvent them; so that it was advisable to keep on the plateau of the glacier. He reached the north-east coast of Greenland at a place which he named Independence Bay; and from the

height called Navy Cliff he obtained an extensive view of lands to the northward with no ice caps, and therefore probably islands.

Peary returned home in September, 1892, and earned sufficient funds for his second expedition, by means of lectures and articles for the press. He had made a very thorough reconnaissance in 1891–92, by which he had tested all his equipments and got well acquainted with the nature of the country. He now resolved to proceed upon his final effort to complete the work he had set himself to achieve. He sailed in July, 1893, with a party numbering fourteen, including Mrs. Peary and her maid, with the intention of erecting the house in Bowdoin Bay, on the shores of Whale Sound. Peary's intention was to commence sledging operations in March, two months earlier than in 1892, and to make for Independence Bay by a route between the previous outward and return routes, so as to avoid the crevasses of the north-west, and the fogs of the higher plateau. Eight Mexican donkeys have been taken as an experiment and fitted with snow-shoes, as has been done with horses in Alaska. On reaching Independence Bay, it is intended to send one party southwards to Cape Bismarck, and the other northwards to connect with Lockwood's furthest. But it appears that Peary is also bitten with the "beating the best record" mania, and thinks of pushing due north with the object of reaching the highest latitude attainable. It is to be hoped that this fancy will not be allowed to mar the real work of the expedition, which is to complete the outline of Greenland.

Mr. Peary is again accompanied by the hardy young Norwegian, Eivind Astrup, who was with him throughout his first journey.

The *Falcon* steamer is to sail next June and proceed to Peary's quarters in Whale Sound; but it is not certain whether he will return or resolve to continue his work during another year. His decision will probably depend on the extent of his explorations this year, and on the amount of work he will have completed. We shall all look out for the particulars of his achievement with the deepest interest. For my own part, I look upon Peary as an ideal explorer. He chose one of the greatest and oldest of the geographical problems that remain to be solved, and he set to work as if he really intended to find the solution. Every detail of equipment was thoughtfully considered, gear was tried and tested before being used, a brilliant preliminary journey over the inland ice was made. All was done in the workmanlike style of a true discoverer. I therefore believe that Peary will succeed. I am sure that he deserves success.

I now come to the saddest part of my Arctic story. Next to northern Greenland, the most interesting part of the unknown region is the land on the western side of the north part of Baffin's Bay, between Smith Sound and Jones Sound, and extending along the north side of Jones Sound to the west and north. It was named Ellesmere Land by Sir

Edward Inglefield, who saw it from the deck of the *Isabella* in 1852. It is called *Uming-mak* (the land of the musk oxen) by the Eskimos. No one, so far as we know, has ever landed between Jones Sound and Smith Sound. But in August, 1851, the *Intrepid* and *Pioneer* went up Jones Sound for forty miles, and Sherard Osborn gave a very interesting account of the cruise. Two of his officers landed on a small island at their furthest point, and found Eskimo remains, abundance of vegetation, and some reindeer antlers. In the following year Sir E. Inglefield entered the sound in bad weather, but did not effect a landing. This is all we know of Ellesmere Land south of Smith Sound.

The absence of knowledge respecting Ellesmere Land, and the comparative ease with which its eastern coast may be reached, induced an accomplished and adventurous young Swede, named Alfred Björling, to turn his attention to its exploration. His original plan was to proceed up Baffin's Bay in a St. John's whaler, and to land as near as possible to Cape Sabine, within Smith Sound. During the next ten weeks he proposed to travel by boat and sledge through Hayes Sound towards the Victoria Archipelago, or North Kent. Björling is a botanist, and he believed that this region, while quite unknown geographically, would offer an exceptionally rich field for botanical researches, because its position makes it a connecting link between Greenland and Arctic America. His return journey was to have been directed either to Cape Warrender, or along the east coast of Ellesmere Land, to a spot where he could be picked up by a returning whaler.

This was a well-conceived plan, provided that proper arrangements were made with a whaler. There is no reason why geographers and naturalists should not spend ten weeks of the summer on such useful work, if properly equipped, and if a vessel will engage to call for them before returning home, at a prearranged spot. Björling received a grant from the Vega Exploring Fund and the proceeds of subscriptions, and left Stockholm in the spring of 1892.

Alfred Björling was born in 1871, and always cherished an ardent desire to make discoveries in the Arctic Regions. In order to prepare himself for this work, he wandered through extensive tracts of the mountainous region of Northern Scandinavia during 1887 and 1888, and he was the first to ascend the peak of Kebnekaisse, the highest mountain in Sweden. In the summer of 1890 he accompanied a Swedish expedition to the west coast of Spitzbergen, made valuable collections of Arctic plants, and assisted in the hydrographical and topographical work. In the following year Björling went to Greenland in one of the Danish vessels; and from Upernavik he made a voyage with Eskimos in an *umiak* along the coast of Melville Bay inshore, as far northwards as the Devil's Thumb. He returned to Sweden in the autumn.

Björling was only twenty-one years of age when he became the leader of the Ellesmere Land Expedition. His companion, Evald

Gustaf Kallstenius, was born in 1868, and since 1886 he had been a student of zoology at the University of Upsala, but he had not been in the Arctic regions before. The two young explorers did not succeed in making an arrangement with a whaler at St. John's, Newfoundland, and, after much difficulty, Björling bought a small schooner of 37 tons, called the *Ripple*, for 650 dollars. He succeeded in persuading three men to form a crew, with himself and his companion. A Dane named Karl Kann entered as skipper, an Englishman named Gilbert Dunn formed the crew, and the cook was a North Briton, named Herbert Macdonald. Owing to the long delay in getting the *Ripple* ready for sea, Cape Walsingham was not sighted until July 24, and on the 28th she arrived at Godhavn, having behaved very well in the ice of Dan's Strait. Björling purchased at Godhavn a fowling-piece and a rifle with ammunition, some provisions and clothes, and a boat. He was provided, before leaving Stockholm, with scientific instruments. He left Godhavn on August 3.

Some anxiety for the gallant young Swedes began to be felt when Lieutenant Peary started on his second expedition last July, and he was requested to obtain information respecting their proceedings, and if necessary to go to their relief. In November, 1893, the whaler *Aurora* returned from Baffin's Bay with a report of the loss of the *Ripple*. On June 17, 1893, the *Aurora* was in the north water of Baffin's Bay, and sighted a wreck on the most south-eastern of the Cary Islands. A boat was sent on shore, and the schooner *Ripple* was found driven on the beach, and almost buried in ice. Not far from the wreck there was a heap of stones covering the dead body of a man, probably the Dane Karl Kann. Close by there was a large cairn, in which a tin pot was found, containing open letters from Björling. It appears that he reached the Cary Islands on August 16, 1892, so that the voyage from Godhavn occupied a fortnight, and he crossed Melville Bay in a single day. On the following day the *Ripple* was driven on shore while they were engaged in taking provisions on board from the depôt of Sir George Nares, apparently with the intention of wintering on the coast of Ellesmere Land. Up to this time all appears to have gone well, but the unforeseen calamity of the loss of their vessel must have destroyed all their anticipations of success. They were obliged to remain several weeks at the Cary Islands owing to bad weather; but eventually Björling resolved to undertake the voyage to Cape Clarence or Cape Faraday on the western side of Baffin's Bay, in an open boat, buoyed with the hope of meeting Eskimos. In his letter he said that he hoped a whaler would visit the Cary Islands in the following summer, and that he would consequently try to return with his people by July 1, 1893. He added, addressing the captain of the supposed whaler, "I shall be very much obliged to you if you would go to Clarence Head (50 miles off), where I shall leave in a cairn information

relative to our fate during the winter. Our provisions, if I cannot find Eskimos, will not last beyond January 1. We are now five men, of whom one is dying." The date is October 12, 1892. The *Aurora* found that Clarence Head could not be approached in June within twenty miles, and she made no further attempt to comply with Björling's request later in the season.

The conduct of the two heroic lads was admirable throughout. There was the usual risk and danger of Arctic work in their project, but no more, before they lost their vessel. Their message is most touching. Not a sign of fear, not a word of complaint, but the simple words of brave men, most pathetic in their simplicity. There is one circumstance which is worthy of notice. The eastern side of Baffin's Bay is within twenty miles of the Cary Islands, and friendly Eskimos are well known to have settlements there. Yet Björling and Kallstenius chose to go in an open boat to the northern side, which is fifty miles off, and where the presence of Eskimos was uncertain. There can only be one reason. The western side was Ellesmere Land, the appointed place of their work, and even in their dire extremity they resolved to go whither duty pointed. It was not foolhardiness, nor thoughtless enthusiasm, but a sense of duty, which pointed the way. One of the most experienced of our Arctic officers thus wrote on the subject: "It is evident that Björling must have had good sterling qualities, to induce two Englishmen to throw in their lot with him. As they could have left him at the Danish settlements, it would appear as if he was a born leader, and might have become a great man if he had had patience to wait until he had gained experience. However, very little would be done in the world without the enthusiasm of youth. The experience of age cannot be combined with it, so that the latter will never have all the say. Yet a good many victims is the result, and in this case that result is much to be deplored."

When the news brought back by the *Aurora* reached Sweden, there was an idea of a relief expedition. But in the end of 1893, a circular from Mr. Robert Stein, who is connected with the United States Geological Survey Office at Washington, announced his scheme for exploring the whole polar area, and for reaching the pole by a system of gradual approaches. He proposed to establish a station, to serve as a permanent base of operations, at Cape Tennyson, on the northern shore of Jones Sound. Here he intended to place fifteen men always provisioned for two years. Thence he would push forward secondary stations into the unknown area, each with five men. Mr. Stein intended to form the first station in Jones Sound, and he also undertook to conduct a search for the relief of the missing Swedish explorers. Baron Nordenskiöld promised a subscription of $2000 in consequence, and the importance of the Stein expedition was very much enhanced. Funds were, however, much needed. I, therefore, made an appeal for

subscriptions in the *Times*, on April 7. But immediately afterwards I was amazed to hear that Mr. Stein had postponed his expedition for another year.

I nevertheless opened a "Björling Relief Fund," and subscriptions were received at the Society's rooms with the object of assisting Baron Nordenskiöld in any measures he might adopt for the relief of his gallant young countrymen. At our meeting on April 9 I made an urgent appeal to the Fellows for subscriptions. Several came forward, including many Arctic officers, who are never deaf to such appeals, and I am happy to say that I have been enabled to forward the sum of £84 10*s*. to Baron Nordenskiöld at Stockholm. But the abandonment of his design by Mr. Stein has left but little time for other measures to be matured. Mr. Nilson has been sent out in the whaler *Eclipse* from Dundee in the hope of reaching Clarence Head; and Dr. Ohlin, with the same object, has proceeded to St. John's, Newfoundland, whence he is to go to Baffin's Bay in June, on board the *Falcon*, the steamer that is to bring back Peary's party.

These arrangements may suffice if the only object is to ascertain the fate of the lost explorers, but if their relief and rescue are intended, it is necessary to despatch a special steamer for the purpose. A vessel engaged in other work, such as whale-fishing or attendance on the Peary expedition, might be induced to touch at Clarence Head, but she might not be able to reach the shore during the time she could allow for that object, and she could not wait beyond a certain time. But a vessel sent for the relief service alone would wait for opportunities, and make a thorough and efficient search. It, therefore, becomes necessary to consider whether the sad duty of ascertaining the fate of those gallant youths, and their companions, alone remains; or whether there is any hope of their having survived.

If Björling fell in with a party of friendly Eskimos, there is no reason why he and his companions should not have survived through two winters, if animal life was abundant round their encampment. This, therefore, is the question: whether there is a reasonable probability of Eskimos being met with near Clarence Head. Many years ago, when I was serving in the Arctic Regions, it was assumed that the western side of Baffin's Bay, north of Lancaster Sound, was uninhabited. In 1851 Sherard Osborn found vestiges of Eskimos in Jones Sound, and when I landed near Cape Warrender, with Sir Erasmus Ommanney, in the previous year, I came upon several stone graves. It was supposed that these remains were very ancient, possibly representing the original migration of the people now settled in northern Greenland. But in 1853 Sir Edward Inglefield found a party of Eskimos in the very harbour where I had landed in 1850, proving that, though wanderers had left their vestiges in the remote past, people of the same race still frequented the region in question.

Their remains were also found by the expedition of Sir George Nares on the western side of Smith Sound. Captain Buddington, who commanded the *Polaris* expedition after Hall's death, met with Eskimos at Port Foulke who had certainly wandered round the whole north-western side of Baffin's Bay from Lancaster Sound. The information collected by Dr. Franz Boas from the Eskimos in Baffin Land is more detailed. They occasionally cross Lancaster Sound from Admiralty Inlet to the neighbourhood of Cape Warrender, but not often, because they have no boats or canoes, and the Sound is seldom frozen over. On reaching the coast of North Devon, they go across the land with their sledges, and in four days reach the coast of Jones Sound, at a place where a long narrow promontory juts out towards Ellesmere Land called *Nedlung*. The promontory becomes an island at high tide, and there is a channel of open water throughout the winter. In the spring this becomes a large open space clear of ice, frequented by enormous quantities of seals. Further north, on the coast of Ellesmere Land, which abounds in reindeer and musk oxen, there was another small colony of Eskimos. These facts are certainly encouraging. Björling would not have landed at Clarence Head until the middle of October, which is against his chances; but, on the other hand, he would not then be more than ten or twelve miles from the Eskimos, if they were still in Ellesmere Land.

On the whole there is ground for hope; and it is discreditable to abandon the unfortunate explorers to their fate. The two Swedish lads are the stuff of which heroes are made, and every civilized people must be interested in their rescue. British subjects are with them, whom we are bound to befriend. Most certainly a special steamer ought to be despatched for their relief. But the time is very short. Hundreds would gladly subscribe their mites, and the funds could have been raised if there had been a year or so to collect it in. But there is barely a month. The only hope was that a few very rich people might be induced to come forward and save the credit of their country. I felt very strongly that a vessel ought to be despatched, and I therefore made every effort, and left no stone unturned to obtain the necessary funds. But I am sorry to say that I was not successful. Our sole hope is now in the efforts of Mr. Nilson on board the whaler *Eclipse*, and of those in the *Falcon*. The *Falcon* will sail from St. John's early in July, under the command of Mr. Henry G. Bryant, the Recording Secretary of the Geographical Club of Philadelphia. It is hoped that Peary's head-quarters at Bowdoin Bay will be reached by July 25, but as Peary and his inland party will not then have returned, the *Falcon* will have about a month to spare for an independent cruise, before embarking the Peary expedition in the first days of September. In a letter I have just received from Mr. Bryant he assures me that he takes a deep interest in the fate of the young Swedes, and his plan includes a

landing at Clarence Head and other points, and a search for records left by Björling and Kallstenius. Mr. Bryant also contemplates the exploration of the channel leading west from Jones Sound. I have only just received these particulars from Mr. Bryant, which place the chances of relief for the missing explorers in a brighter light. I heartily wish all possible success to the Peary Auxiliary Expedition and its gallant leader. Dr. F. A. Cooke, who was with Peary in 1891–92, proposes to go up Baffin's Bay with a party of excursionists on board the steamer *Newfoundland*, owned and commanded by Captain J. A. Farquhar, leaving New York on June 25, and intending to return on September 10. Perhaps Captain Farquhar may be induced to visit Clarence Head.

I must take this opportunity of expressing my thanks to Mr. Trevor-Battye for his enthusiastic efforts to promote the despatch of a relief vessel; as well as to Captain Haserick and to Mr. William Pine Coffin, who both felt deeply the shame of leaving the gallant explorers to their fate, and were ready to help, and did help, with the utmost zeal and ardour in so good a cause. Mr. Trevor-Battye, failing the relief expedition, is about to start in the steamer *Saxon* of 150 tons, in company with Mr. Mervyn Powys, to make a thorough ornithological as well as geographical examination of the little-known Kolguev Island, I believe under Lord Lilford's auspices. Mr. Trevor-Battye has studied under Mr. Coles, and the Council has granted him the loan of instruments necessary for navigation. To my mind Mr. Trevor-Battye is cut out for a successful explorer. A hunter of elk on ski in Sweden, of moose and wapiti in the Rockies, a salmon fisherman in the far West, of powerful physique and great powers of endurance, he is also a naturalist, an artist, and an accomplished author. It is to the training and encouragement of such men that the Society must look, if we are to have great travellers in the future, to advance our science, and to do honour to our country.

Circumstances have obliged us to pay very special attention to Arctic questions in the past year; but the great meeting which assembled to hear Dr. Murray's paper on the 27th of last November, is our witness that the Antarctic Regions have not been forgotten. All the scientific societies in the United Kingdom and on the continent are now of one mind as to the importance of Antarctic exploration, and they are convinced that it must be a Government undertaking. It is half a century since Sir James Ross returned, and the time has come for renewing the work which he commenced so admirably. The arguments of Dr. Murray must have brought conviction to the minds of all who had not previously studied the subject. An expedition is necessary for magnetic observations alone. Professor Neumayer wrote to Dr. Murray that "it is certain that without an examination and a survey of the magnetic properties of the Antarctic Regions, it is utterly hopeless to strive, with prospects of

success, at the advancement of the theory of the earth's magnetism." Dr. Murray thus summed up the work of a modern Antarctic expedition: "To determine the nature and extent of the Antarctic continent, to penetrate into the interior, to ascertain the depth and nature of the ice cap, to observe the character of the underlying rocks and their fossils, to take magnetic and meteorological observations both at sea and on land, to observe the temperature of the ocean at all depths and seasons of the year, to take pendulum observations on land, to bore through the deposits on the floor of the ocean at certain points to ascertain the condition of the deeper layers, and to sound, trawl, dredge, and study the character and distribution of marine organisms." All these observations are earnestly demanded by the science of our day for many purposes. Science demands a steady, continuous, laborious, and systematic exploration of the whole southern region with all the appliances of the modern investigator.

Enlightened by the exhaustive and most interesting paper of Dr. Murray, and encouraged alike by his enthusiasm and by the sound sense of his remarks in favour of the renewal of Antarctic exploration, our Council appointed a committee with instructions to report upon the best means of achieving the objects set forth by Dr. Murray. Our Antarctic Committee consisted of Sir Joseph Hooker, one of the two survivors of Sir James Ross's expedition; of Sir George Nares, the only living naval captain who has navigated the Antarctic Ocean; of Captain Wharton, the hydrographer; of Admiral Sir Erasmus Ommanney, who has long been a warm advocate of such an enterprise; of Admiral Sir R. Vesey Hamilton, one of our best Arctic authorities, who has also written on the subject of Antarctic navigation of Dr. Murray and myself.

The Committee, in its report, enumerated the scientific results of Antarctic research, especially dwelling on the necessity for an accurate study of terrestrial magnetism. The experiences of early navigators in approaching the pack edge are then reviewed, and it is shown that Sir James Ross alone boldly entered it, with a view to passing through it, on two occasions with success. In January, 1841, he forced his way through it in four days, reaching an open sea, discovering Victoria Land, and penetrating to the 78th parallel. On the second occasion he entered a pack several hundreds of miles in width, and he was forty-two days getting through, but he again succeeded. In 1843, on his third attempt, it was too late in the season when he entered the pack, and the young ice was forming rapidly. If it had been December instead of March, he might have effected more. The committee then contrasts the conditions of navigation in the Arctic and Antarctic Regions. In the north there are fields of ice of vast extent, often fixed for months in one place by intricate channels. The danger of long detention, arising from being beset in such ice, is not so serious in the Antarctic Regions. But there are other dangers which are equally formidable. In gales of wind

and in fogs, and even in calms, sailing vessels are in much danger, when involved in the pack, from the swell caused by heavy gales, and when it is impossible to avoid collisions with huge masses of ice. On such occasions a sailing vessel is helpless.

But as screw steamers would, of course, be employed on any new Antarctic expedition, these dangers would be very much reduced, and a great saving of time would be effected. Calms occur, and there are often adverse winds when there is clear weather. At such times sailing vessels would be beating up 20 miles while a steamer might make 100. With steam it might be possible to do in one season all that which, in the cases of Wilkes and Ross, occupied three. A steamer would be in little danger from bergs except in fogs, and in heavy gales she could lie to in safety under their lee, instead of drifting at the mercy of wind and waves. She would also be better able than a sailing vessel to double the pack. The weak point of a steamer in the pack would be during a gale of wind. She might avoid collision with the ice better than a sailing vessel, but not altogether. But specially adapted screw steamers would no doubt facilitate Antarctic navigation, and remove many of the difficulties which had to be encountered by sailing vessels.

Having fully considered the exigencies of Antarctic navigation, the Committee recommend that the expedition should consist of two vessels as well strengthened against the ice as were the *Erebus* and *Terror*, fitted with steam-power, and specially protected aft. It is indispensable that officers and crews should be under naval discipline, and a full commission of three years would be necessary for the performance of the work. Apart from the valuable scientific results of an Antarctic expedition, the Committee dwell upon the excellent effect that all such undertakings, in which our country has been prominent, have invariably had on the navy, by maintaining the spirit of enterprise.

Having been adopted by our Council, the report of our Antarctic Committee, together with Dr. Murray's paper, was transmitted to the Royal Society, with an urgent request that that learned body would take the subject of the renewal of Antarctic discovery into serious consideration, with a view to its being brought before her Majesty's Government in a memorial presented by the Royal Society, with the cordial assent of every scientific body in the United Kingdom. I understand that a committee has been appointed by the Council of the Royal Society, and that the important question is receiving mature and careful consideration. The Fellows may rest assured that no efforts on the part of our Council will be wanting, and that the duty of promoting the renewal of Antarctic exploration will be borne in mind. If men of science are unanimous, both as to the importance of the work and the best method of executing it, and if they are backed by enlightened public opinion, the Admiralty will be only too glad to take the subject into favourable consideration, and difficulties raised by the Treasury will

be overcome. But unanimity and the support of public opinion are absolutely essential to success.

I have devoted the body of my address to work within the polar regions. I will not, however, omit to refer to the labours of others in regions which, through their exertions, may become the main subjects of future addresses. You have recently heard an account of the results of the journey of Mr. and Mrs. Littledale, which are in many respects remarkable. It was a very hazardous adventure; it covered several hundreds of miles of entirely new ground, and very careful observations were taken all along the route, which have been embodied in a valuable map. The additions made by Mr. Littledale to our knowledge of the famous route to China, followed by Marco Polo, are of the first importance.

Of no less interest is the journey into the Hadramaut valley accomplished by Mr. and Mrs. Bent, an account of which was presented to us a week ago. They were accompanied by an excellent surveyor deputed by the Government of India, and by a botanist from Kew, while their own archæological notes, photographs, and sketches are of exceptional value. These experienced travellers were so interested in the strange and almost unknown country of Hadramaut that they hope to return to continue their explorations in Arabia.

In Africa there has been, and continues to be, abundant activity, as the monthly pages of our Journal have shown. We have already heard a very full account of Dr. Gregory's expedition to Mount Kenia; and we hope shortly to have full details of the expedition into new country north of the Tana river, led by Mr. Astor Chanler, accompanied by Lieutenant von Höhmel. Mr. Scott Elliot is actually exploring the Ruwenzori region, and we have helped to equip other young African travellers who hope to open up new ground. Mr. Coryndon, a friend of Mr. Selous, has already started for the country lying between the west shore of Lake Tanganyika and the Congo, where he will remain for at least a year. Dr. Donaldson Smith, a young American gentleman, leaves in a few days for Somali-land, whence he will push southward to Lake Rudolf, thus connecting the discoveries of Count Teleki with those that have been made further north.

How valuable a service is being performed by our indefatigable map curator, Mr. Coles, in giving instruction to intending explorers, is shown by the work that has been done by his pupils within the last two years. In Africa, Major Leverson and Mr. F. A. Lamb have done surveying work on the Anglo-German Boundary Commission, Dr. J. W. Gregory has surveyed and mapped the Mount Kenia region, Mr. Teed is now surveying in the territory of the Royal Niger Company, Captain Gallwey has been at work in the Oil Rivers Protectorate. Lieutenant S. Vandeleur of the Scots Guards has made an exceedingly well-executed route-survey in Somali-land, checked by observations for

latitude. Mr. G. F. Scott Elliot is at work in the Ruwenzori region. In Asia, Mr. Conway has made surveys and a map of the Karakoram glaciers, and Mr. Littledale has done valuable work in Central Asia and on the Hoang Ho. In America, Mr. C. W. Anderson has been working in British Guiana; and our travelling students, Mr. G. B. Grundy and Mr. Cozens Hardy, have surveyed, one the battle-field of Platæa, the other a part of Montenegro.

I must not omit to refer to the admirable work accomplished by our librarian, Dr. Mill, in the survey of the English lakes, in which he has opened up a hitherto unknown part of our country, although a part which is under water. At one of our meetings in June, Dr. Mill will explain to us some of the more interesting results of his limnological investigations.

On several occasions during the session I have regretted the absence of my illustrious predecessor Sir Henry Rawlinson, on whom the mantle of Sir Roderick fell in 1871. I especially missed him on the occasion of Colonel Sawyer's paper on the Bakhtiari country being read; and, indeed, I had a faint hope that he might once more appear amongst us on that occasion, to brighten the discussion by his profound knowledge and unrivalled powers of exposition. Sir Henry was one of the best of our Presidents from every point of view, and I do not know his equal in giving life to an apparently dull subject, and in awakening an interest in geographical details by enriching them from the abundant stores of his historical memory. I shall never forget the rapt attention with which the audience listened to his account of the route taken by the gipsies on their way towards Europe, from the valley of the Indus. He is unrivalled in showing the dependence of history on a knowledge of geography; and though he is often missed by those who remember the time when he presided here, he can never be replaced. I still indulge the hope of seeing him amongst us before the session is over.

In conclusion, it is my duty to announce the retirement of Mr. Douglas Freshfield from the post of Secretary, and that he has declined to allow himself to be put in nomination as a member of the new Council. Mr. Freshfield was my colleague from 1881 to 1888, and for the last six years he has been senior Secretary of the Society. A renowned climber and Alpine explorer, he now holds the honourable post of President of the Alpine Club. But he is not a mere climber. He is well versed in the historical literature of the Alps, as is shown by his papers on the Alpine notes of Leonardo da Vinci in 1884, and on the pass of Hannibal in 1886. He was also the author of sketches in the mountains of Ticino. Having exhausted the Alps, Mr. Freshfield turned to the Caucasus, and our *Proceedings* have been enriched by four of his papers, describing with a master-hand the physical aspects of that little known range, and his own well-planned and successful ascents. He also published a work on Central Caucasus and Bashan. Mr. Freshfield gave up much of his

time to the Society, and was indefatigable in his supervision of the work of the departments, and initiated our large and valuable collection of photographs. He introduced the use of photographic slides at our evening meetings. He took a special interest in educational questions, and the Society's arrangements with the Universities of Oxford and Cambridge owed much to his active and zealous aid. He read a paper of great importance at the British Association Meeting of 1886, on "The Place of Geography in Education." In that paper he truly remarked that much of the literature of physical science was rendered unreadable by the absence of the art of letters in its producers. The classics, he added, are the authors and models of the art of clear and condensed expression for European literature. And this reminds me that one of Mr. Freshfield's highest qualifications for the post of our Secretary was that he was a classical scholar. How often have I deplored the loss of this qualification through having gone to sea so young! Mr. Freshfield conducted a good deal of correspondence, both private and official, the results of which were very conducive to the best interests of the Society. As an example, I may mention his letters to the India Office, to which were due the establishment of an excellent understanding with the departments in India, and to our being regularly supplied with geographical information which was previously withheld. He was joint editor of the three latest editions of 'Hints to Travellers,' taking the subject of outfit as his own part of the work. For these varied and important services the warm thanks of our Council and of the Society are justly due to Mr. Freshfield. Although he retires, by his own desire, from any further official connection with the Society, he will, I am sure, continue to take a warm interest in our proceedings, and to be an active and zealous, though independent member of our body.

We have had heavy losses this year from the deaths of distinguished Fellows, whose obituaries have appeared in the numbers of our Journal. Among them were several dear friends of my own, and I cannot help mentioning how deeply we have all felt the loss of our late Foreign Secretary, General Sir Beauchamp Walker.

I have to thank Captain Wharton, the hydrographer, for the account which follows of the work that has been done during the year by our naval marine surveyor, to whose hard work navigation and geography owe so much; and Mr. C. E. D. Black for his abstract of the work of the Indian surveys during the past year.

The magnificent work prepared by a Commission, under the auspices of the Italian Government, as Italy's contribution towards the celebration of the fourth centenary of Columbus, has just reached me. In the name of the Fellows of this Society, I have warmly congratulated our brother geographers in Italy on its appearance. A review of the great Colombian work follows this Address.

Obituary of the Year.

General Saunders Abbott; J. D. Allcroft; Sir James Anderson; Richard Edward Arden; F. B. Ashton; Sir Samuel White Baker, Pasha; General Sir T. D. Baker, K.C.B.; General Sir George Balfour, R.A., K.C.B.; W. H. Balls; W. L. Barclay; H. M. Becher; Richard Bird; George Bonnor; J. C. Bowring; G. P. Boyer; Alex. Low Bruce; Colonel J. J. N. Buchanan; Lord Calthorpe; Commander Verney Lovett Cameron, R.N., C.B.; Colonel Edward Cave; Victor William Chemery; Colonel F. C. H. Clarke, R.A., C.M.G.; Henry Cookson; Rev. Henry Woodward Crofton; the Earl of Cromartie; Rev. Thomas Debary, M.A.; Fitzwilliam H. Dick; E. A. Drummond; Charles Bernard Durkin; Lord Ebury; Edward Bickerton Evans; Henry Prinsep Fane; Lieut.-Colonel W. Spiller Ferris; Captain the Hon. George Fitzclarence, R.N.; John Fleming; Professor P. W. Forchhammer; Frederick Francis; Alexander D. Frater; George H. Garrett; General the Hon. Sir Alexander H. Gordon, K.C.B.; J. Graham; Joseph E. Green; Rev. J. B. Gribble; Captain R. C. Halpin; James L. Hart; Thomas Hawksley, F.R.S.; Horace Augustus Helyar; John Heugh; W. F. Hooper; Edward M. Hopkins; Augustus Huxtable; Rear-Admiral Marin H. Jansen, D.R.N.; Edward King; John King; Lieut.-General W. C. R. Macdonald, C.B.; Sir William Mackinnon, Bart.; General E. Mackirdy; General Sir W. M. S. MacMurdo, K.C.B.; Lieut.-General Sir Richard Meade, K.C.B.; G. F. Mewburn; Thomas Holdsworth Newman; Robert Nicholson; F. H. S. Orpen; W. Cotton Oswell; Admiral John E. Parish; Mansfield Parkyns; Vice-Admiral H. B. Phillimore, C.B.; Sir Gerald Herbert Portal, K.C.M.G., C.B.; Hon. Leopold Powys; F. S. Pulling; John Rae, M.D., F.R.S.; John Bagot Scriven; Rev. William J. Smith; Richard Spruce; George Stanton; Alfred Strong; Captain A. Styan; Edward Thornton, C.B.; Colonel D. H. Trail, R.E.; Admiral Sir George Tryon, K.C.B.; Samuel Richard Van Campen; Sir Harry C. Verney, Bart.; Right Hon. Lord Vivian, K.C.M.G.; General Sir C. P. Beauchamp Walker, K.C.B.; Henry Fraser Walter; G. Andres Wilson; Major-General Edie Lloyd Wynne; H. G. Yates.

Admiralty Surveys.

Under the orders of the Lords Commissioners of the Admiralty there have been employed in hydrographical surveys in various parts of the globe, 7 steam-vessels of war and 2 small hired steam-vessels, with crews consisting of 66 officers and 629 men.

The various localities where these surveying vessels have been employed are as follows: The shores of Great Britain, Newfoundland, Malta, Hong Kong, Straits of Malacca, Solomon Islands, Australia east coast, New Hebrides, and Tasmania. As usual, a report of the work executed by each vessel has been prepared, and will be presented to Parliament. What has been accomplished may be summarized as follows:—

On the east coast of England a re-survey of Filey Bay, Yorkshire, has been made, and the approach to King's Lynn was resounded. In continuation of the work of the preceding season, an area of about 300 square miles in the North Sea, situated to the northward and eastward of the Humber river, was thoroughly sounded out on a scale of two inches to the mile. A survey was completed of the river Deben, in Suffolk, from its entrance up to Ramsholt dock; and various localities in the entrance to the Thames, where changes are constantly taking place, were examined.

On the south coast a careful survey was made of Spithead and its eastern approaches, many years having elapsed since the last survey was made, but it was

found that the changes which have taken place have not been great. In consequence of reports that the depth in the main anchorage in Plymouth Sound was less than shown on the chart, a thorough re-survey was made of the Sound, Cattewater, and part of the Hamoaze, and the unpleasant fact was revealed that the larger ships would in certain places in the Sound touch the bottom, with the water at the level to which it occasionally falls. Dredging has consequently been at once undertaken.

On the west coast of England an examination was made of the dockyard bank in Pembroke Reach, which resulted in the discovery of several rocky heads and patches. A re-survey of the English and Welsh grounds in the Bristol Channel was completed, and considerable alterations were found to have taken place in this locality. A large scale plan was also made of the harbour and bay of Ilfracombe. In continuation of the work of the previous year, the survey of Carnarvon Bay was taken in hand and completed as far as the South Stack; during the progress of this work, several rocks, hitherto uncharted, were discovered. A survey of the north coast of Anglesea was also taken in hand and completed between the Middle Mouse and Lynus Point.

On the east coast of Ireland a re-survey of Wexford harbour and bar was commenced, when it was found that considerable alterations had taken place since the previous survey in 1881.

The work on foreign and colonial shores has been as follows: On the west coast of Newfoundland a survey of St. George's Bay was nearly completed; this work will be especially useful, as at present there is no chart of the locality in which the navigator can place any confidence. During the progress of the survey, no fewer than nine rocks, with a less depth of water than five fathoms over them, were found to exist round the shores of this bay.

In the Mediterranean a re-survey of the Maltese islands has been commenced, and the result of the season's work will be a new chart, on a scale of 4 inches to the nautical mile, of the Comino channels and the coast of Malta from Madalena Point to Ras el Raheb; the main part of the triangulation of the remainder of the island was also completed. The examination of the new channel into Alexandria harbour, called the "Straight Boghaz Pass," was carefully carried out. Extensive dredging operations have lately taken place there, but several spots were detected where the rock had not been levelled to the required depth.

On the coast of China, the eastern approaches to Hong Kong were surveyed between Cape Collinson and Cape D'Aguilar, thus completing the whole of the Tathong Channel. The survey of the western part of Hong Kong harbour was completed, and on the south side of the island a survey of Tytam Bay, with the neighbouring island and channels, was executed, so as to join up with the other work at Cape D'Aguilar.

In continuation of the work done on the Macclesfield bank in the preceding year, a systematic survey of the eastern half of this extensive coral atoll was carried out, and now the whole of the rim has been carefully examined. No actual dangers to navigation were discovered during this survey, but the eastern portion of the lagoon abounds in coral patches, with from 7 to 8 fathoms of water over them. On the outer rim 6 fathoms was the least water found. The dredge was in daily use, and a valuable collection of corals obtained from all parts of the bank, in depths varying from 8 to 74 fathoms. The specimens were examined by Dr. Bassett-Smith, and afterwards forwarded to the British Museum.

In the southern part of the China Sea, the survey of the Anamba Islands was continued, and now the whole of this hitherto little known group has been completely charted.

Telegraphic meridian distances were obtained between Singapore, Malacca, and

Penang, and the astronomical positions of several salient points in the Straits of Malacca carefully determined. A large scale plan of the mouth of the Klang river, in the Malay Peninsula, was also completed.

In the Solomon Islands, of which our hydrographical knowledge is exceedingly meagre, a survey has been commenced of New Georgia and adjacent islands. By the end of the season an examination had been completed from the western end of Gizo Island, including Ferguson Passage, Rendova and Montgomery Islands, to Cape Pitt, and from thence along the northern shore to the westward as far as the Marovo opening into the lagoon. The astronomical positions of several places were also carefully determined. A considerable amount of rainy weather was experienced during the progress of the survey, from the end of July to the end of December, but the season's work has resulted in the charting of a large area hitherto almost unknown. In spite of the evil reputation enjoyed by the natives of New Georgia, no difficulty was experienced with them; and, after their first timidity had been overcome, they were most friendly and obliging.

In Australia, the survey of the inner route along the coast of Queensland was continued from the Bird Islands, 13 miles north-west of Cape Grenville, and completed as far to the southward as the Piper Islands. During the progress of this survey, a rock, with only 17 feet of water over it, was discovered, a mile and a half north of the track recommended, between Home Islands and Cockburn reef. Fortunately this rock has not been found by a vessel striking on it.

In the western approach to Torres Straits, a fortnight was devoted to the examination of an area in the vicinity of the Proudfoot shoals, where two small dangerous rocks had been reported in the fairway, and out of sight of land. A careful search failed to discover any new danger, though a depth of $2\frac{3}{4}$ fathoms was found on the West Bramble patch, hitherto supposed to have no less than 4 fathoms over it.

In consequence of the more frequent visits of H.M. ships to Tasmanian waters a plan of Port Arthur in the Tasman Peninsula was completed on a scale of 3 inches to the mile.

The survey of the New Hebrides has been continued, and the whole of the south coast of Ambrym, west and north-east coasts of Epi, with the channel between the two islands, including Paama and Lopevi, have been charted on a scale of one inch to the nautical mile, as well as the south coast of Malekula. Larger scale plans of Dip Point anchorage and Craig cove on Ambrym Island; Ringdove Bay, Foreland anchorage, and Nelson Bay on Epi Island; Maskelyne Islands, Tomman Island, and Port Ravallec on Malekula Island, have also been executed.

Naval surveying officers have also been employed, with the sanction of the Admiralty under the orders of the Indian Government, and during the season continued the survey of the Coromandel coast from False Divi Point as far to the southward as Shallingar shoal in lat. 14° 20′ N. During the progress of this survey, several new shoals which are dangerous to navigation were discovered; they have doubtless been formed since the last survey was made in 1848, and are probably due to the northerly set of the currents during the greater part of the year redepositing the silt brought down by the rivers, augmented by the sand and mud stirred up by the sea during the strong monsoons and hurricanes. A large scale plan of the port of Bombay was completed, and the survey of the coast to the northward of that harbour commenced. By the end of the year it had been completed as far as lat. 19° 20′ N. The Laccadive Islands were visited, and plans made of Ancutta, Kavaratti, and Suheili Islands, besides lines of deep soundings obtained between various islands of the group.

The importance of accurate surveys on a large scale is strikingly illustrated by the number of rocks and dangers to navigation annually discovered, this number

being steadily on the increase; no less than 201, which it has been deemed necessary to notify by Notices to Mariners, having been reported during the year 1893.

During the year the hydrographic department has published 69 new charts and plans, and 16 plates have been improved by the addition of 16 new plans, while 4836 corrections have been made to the chart plates.

GEOGRAPHY AT THE UNIVERSITIES.

The following reports have been sent for submission to the Council by the Reader in Geography at Oxford, and the Lecturer in Geography at Cambridge and Manchester.

OXFORD, *May* 25, 1894.

My lectures during the past academic year have been well attended. The number of undergraduates reading history varies somewhat from time to time, and the classes during Michaelmas and Hilary Terms were rather smaller than in the previous year, when they were larger than on any earlier occasion. That the utility of the work has not diminished in the opinion of the tutors who send students to the lectures, is indicated by the fact that the number of colleges supplying students is the same this year as last.

The chief gain of the past year has, however, been in the subject of Physical Geography and in the summer term. For the first time since the foundation of the Readership, there has been a fair attendance in this subject and in this term, though naturally the numbers are not equal to those taking Historical Geography in the winter terms. At last, therefore, after seven years of gradual progress, the whole of the instruction offered by the Reader has been received by adequate classes.

The precise statistics are as follows :—

Michaelmas Term. Subject—Historical Geography. Lectures twice a week. 35 men from 12 colleges; 12 ladies from 4 halls.

Hilary Term. Subject—Historical Geography. Lectures twice a week. 37 men from 14 colleges; 6 ladies from 2 halls.

Summer Term. Subject—Physical Geography. Lectures twice a week. 6 men from one college; 4 ladies from 2 halls.

The electors have chosen Mr. C. R. Beazley, M.A., Fellow of Merton College, for the Geographical Studentship of the current year. Mr. Beazley is proposing to work on the East Coast of Africa, with a view to the better identification of points mentioned in the Periplus of the Erythrean Sea and other similar geographical documents. Mr. G. B. Grundy, the student of 1892, has published the results of his investigations in Greece in a small volume recently issued by the Society. Mr. W. H. Cozens-Hardy, the student of 1893, has worked on the borders of Montenegro and Albania, and is now engaged in the preparation of his results.

A course of ten lectures, under the auspices of the Society, in continuation of those delivered by me in the winter of 1893, was given in London in the months of January, February, and March in the present year. Owing to various circumstances, the attendance was not equal to that of last year. I believe, however, that if the proposals now under your consideration be adopted, you may look for much larger results from the next course. From an educational point of view, there is no reason to be dissatisfied even with the last course, for the audience included at least thirty *bonâ-fide* teachers.

H. J. MACKINDER, M.A.

KING'S COLLEGE, CAMBRIDGE, *May* 18, 1894.

Having been appointed successor to Mr. Buchanan, as Lecturer in Geography at Cambridge, I began my duties in October last with an inaugural address on the "Progress of Geographical Discovery," which was attended by a large audience, including the Vice-chancellor of the University.

During Michaelmas and Lent Terms I lectured on the "Principles of Physical Geography" to a satisfactory class averaging fifteen in number. Through the kindness of Professor Liveing I had an excellent lecture-room in the chemical laboratories placed at my disposal. The use of a room in the New Museums has also been temporarily granted, for the storage of apparatus, of which at present there is none. This deficiency, however, I hope to be able to remedy to some extent, owing to the favourable reception of an application for a grant of £20 from the University chest.

Last summer I gave my second series of lectures at the Owens College, Manchester, when a marked advance on the first year was made.

Two courses of lectures were given, one on a special subject, "Asia," designed for the requirements of a special class of students, and the other of more general interest. The numbers of those attending the courses were twenty-nine and ten.

The quality of the work done showed an improvement, and a satisfactory feature, indicating an increased interest in the teaching of geography, was the attendance as students of several persons who are engaged in educational work outside the college.

H. YULE OLDHAM.

THE SURVEYS OF INDIA, 1892-93.

By C. E. D. BLACK.

THE work of the Indian Survey Department during the years 1892–93 was carried on by twenty-one parties and three small detachments, who were engaged as usual on trigonometrical, topographical, forest, cadastral, and traverse surveys, latitude and tidal observations, spirit-levelling, geographical surveys and reconnaissances, and the regular mapping and reproduction ancillary to these operations. The triangulation lay along the meridian of 96° 30′ in Burma, north of Mandalay, and was extended for a distance of 70 miles as far as the parallel of 23° 30′ N. latitude. A secondary series on the parallel of 21° was carried eastwards over 104 miles, the measurement beginning a little east of Fort Sandeman and terminating near the Mekong. The most important topography delineated was in Baluchistan and the adjoining parts. A detailed reconnaissance through the Helmand desert, Sistan, and Perso-Baluchistan was entrusted to Mr. E. A. Wainwright, who was assisted by Ahmed Ali, K.B., Atma Ram, and Sheikh Mohiuddin; while Yusaf Sharif, K.B., did a good outturn of surveying along the Persian coast, his first base being measured at Chabar, and his second at Bandar Abbas. His work generally was connected with Mr. Wainwright's reconnaissances. The extension of triangulation into the Zhob valley was executed by Captain Mackenzie, while Messrs. Claudius and Tate took charge of the special surveys near Quetta and the settlement surveys for revenue purposes in the Peshin valley. Mr. H. Kitchen had control of the half-inch topography of the Lower Bela district, a tract which is comparatively open near the coast of the Arabian Sea, but becomes very rough to the northward. As the spring advances, water in this region is scarce and bad, and there is great difficulty in keeping up communications in the hill districts. Mr. Kitchen never recovered from the trying effect of the season's work, and died at Quetta on July 5, 1893. Some 3700 square miles of topography in Makran were completed by Abdul Guffar, K.S., who with Atma Ram was subsequently, in May, 1893, deputed to Gilgit to undertake reconnaissance work there. A more extraordinary change of climate from the burning wastes of Makran to the eternal snows of the Himalayas can hardly be conceived. Two other native surveyors were attached to a political party on tour through the outlying districts of Zhob and Kundar, and brought back 4500 square miles of reconnaissance on the quarter-inch scale. Colonel Holdich visited the Makran and Persian coasts, and made some interesting experiments with a view to estimate the value of the cable for longitude determinations. Unfortunately, though special reports were prepared by him on these operations as well as on the general subject of trans-frontier surveys, none of these reports finds

place in the present account of the survey, an omission which is the more inexplicable as the Baluchistan narratives have been hitherto regularly included in the annual reports of the Surveyor-General. During the year Sub-assistant Superintendent Imam Sharif returned from special duty with the Anglo-German boundary-demarcation party in East Africa. He had been warmly commended for his able assistance as a topographer by the British Commissioner, and received a decoration from the Sultan of Zanzibar. His health has, however, suffered considerably from hard work and exposure amid the dangers of the African climate. Another important survey commenced during the year was that of the River Indus in Sind, from the Punjab frontier to the sea—a measure which has been rendered necessary by the great changes that have taken place in the course of the river since it was last mapped in 1856 to 1870. The new survey will occupy at least three years. The cadastral and other detailed surveys in Bengal, Burma, and elsewhere, do not call for special notice, but mention should be made of the work of two sections of No. 11 party, who accompanied the Commission for demarcating the boundary between Burma and Siam. A good deal of country had already been well reconnoitred by the surveyors with previous boundary missions, but corrections were made by No. 11, and gaps filled up where necessary. Colonel Woodthorpe and Mr. Kelly were in charge of the eastern, and Messrs. Doran and Shaw of the western section. The boundary itself being in every case a conspicuous watershed or the course of a stream, very little artificial marking has been adopted beyond clearing all salient hilltops of forest, and marking one or two trees with the broad arrow and '93. The programme of the party for the current season (1893–94) was to continue the survey of the Shan States, to fill in a small gap in the map of the Karenni country, and to complete the Anglo-Siam boundary. In the northern Trans-Salwen Shan States, Captain Renny-Tailyour mapped in 1892–93 over 5000 square miles of a hitherto but little known region, while to the north east of Lashio a sudden rising of the Kachins was suppressed by the promptitude and pluck of the survey officer, Mr. J. M. Kennedy. The most interesting new ground explored was that covered by Captain Renny-Tailyour's operations. This included the Wa country, whose inhabitants had been reported to be cannibals and to live like wild men in the jungles, but who turned out to be more civilized than expected. They are all spirit-worshippers, and offer up large numbers of buffaloes, pigs, and fowls; their least pleasing idiosyncrasy is an idea that on very special occasions, such as when they sow their fields, or an epidemic of sickness is abroad, it is advisable to offer up a human head. These heads are obtained in the wild Wa country by sending out a head-hunting party, who catch any stray travellers they come across and decapitate them. Near Hsan Htung Captain Renny-Tailyour and his party came on the bodies of three men lying on the road whose heads had

been cut off a few hours before. The Was near Lün Long are said by the Shans to be "not so very bad," the principal difference being that they buy their heads instead of raiding for them. The country generally is hilly and populous, the villages are numerous and large and are connected with each other by very good roads, but there is next to no trade. The main road usually runs into the heart of the village, through a tunnelled entrance, which proved a great obstacle to transport. Much ground is given up to the cultivation of the poppy for opium, and large silver-mines undoubtedly exist; but though gold is also said to be plentiful, the surveyors did not see any. No actual fracas took place with the Was, but Captain Renny-Tailyour thinks that the next attempt to traverse their country may meet with considerable opposition.

The photographic, lithographic, drawing, and other head-quarter officers of the Survey did good work as usual. Among the more notable maps may be mentioned the sheets of the new survey of Calcutta, which are being rapidly turned out, and a third edition of the two-sheet map of the city. A new geological map of India, on the scale of 96 miles to the inch; a map on the same scale, showing the railway lines and distribution of coal; and three maps illustrating events in Mr. G. W. Forrest's 'History of the Indian Mutiny,' were also completed, besides a large number of plates of illustrations for archæological and other works published by Government. Colonel Waterhouse records his experiments for reproducing brush-shaded maps, and printing them in colours by heliogravure, one of which has been attended with decided success. In this case, the hills were drawn on ground-glass with a black creta-levis pencil, which drawing served at once as the positive transparency for obtaining the image on the copper plate. A capital specimen of this photo-etching, printed in three colours, is appended to the new volume, and there appears to be no doubt that the greater clearness, finish, and durability of the copper plate will render the process far superior to lithography for high-class map work.

THE ITALIAN MONUMENT TO COLUMBUS.

By CLEMENTS R. MARKHAM, C.B., F.R.S.

ITALY has undoubtedly contributed the worthiest and best memorial in honour of the fourth century of the discovery of the new world by her illustrious son. A collection of all the contemporaneous documents relating to Columbus, with essays by the most learned men to be found in the land, on every disputed point and every question of interest relating to the great discoverer, is a noble monument. Many of the brightest intellects of his native country have devoted five years to the grateful task of elucidating the history of their immortal compatriot

and of his discoveries. No less than six have died while the work was in progress. The Government of Italy appointed a Royal Colombian Commission, and spared no expense in the production of these fourteen splendid volumes which form the Italian monument to Columbus, either as regards paper, or type, or illustrations.

The first two volumes of the first part contain all the known writings of Columbus, and photographs of all his autographs, with a preface and elaborate dissertations by Signor Cesare de Lollis, who was formerly Secretary to the Historical Institute of Italy. This part of the work had been destined for Mr. Harrisse, if he had not separated himself from the undertaking. Here we are given the journal of the first voyage, the letters to Santangel and Sanchez, all the reports and letters to the sovereigns, the first entail, the correspondence with Roldan, Gorricio, and Ovando, and the Admiral's letters to his son. Then follow the 'Profecias,' and all the notes in the Admiral's handwriting, in the margins of the 'Imago Mundi' of Pierre D'Ailly and other books in the Colombian Library at Seville. All the scattered information that formerly had to be searched for in various works, and some of which was only accessible in manuscript at Seville, is now collected in these two volumes.

The second part is only second in interest. Here the disputed questions respecting the birth and family of Columbus, and his conduct on various occasions in after-life, are discussed by so competent a critic and historian as the Signor Cornelio Desimoni. He settles the time and place of the birth of the great Genoese—it is to be hoped finally—and discusses the dates of his arrival in Portugal and of the Toscanelli letters. There are, of course, some points which can never be cleared up owing to insufficiency of evidence, and among them is the legitimacy of Fernando. Desimoni believes that the evidence against the great discoverer kicks the beam, and adds, "Colombo infine era un uomo; chi oserà lanciargli la pietra." The Genoese historian also discusses the knowledge and the character of his famous fellow-townsman. The evidence respecting the corsairs named Colombo, whose appearance in history has caused so much confusion, is fully treated by Alberto Salvaginani, who also has occasion to examine critically the meagre facts for forming a judgment on the date of the arrival of Columbus in Portugal, and of the Toscanelli letters.

Signor Achille Neri ably sets forth the history of all known portraits of Columbus, engravings of which are given in the volume. It is now admitted that the picture once in the gallery of Paolo Giovio, and now possessed by his descendant, Dr. Alessandro de Orchi, of Como, is the only one with any pretension to authenticity; and that all those of similar type are merely imitations of it, with various alterations. Such are the pictures at Madrid and Florence, the Cuccaro, Cogoleto, and Rouen portraits, and even that belonging to Roselly de Lorgues, as well

as the engravings in the 'Elogia virorum.' All others are simply the fruits of the painters' not very imaginative invention, from that attributed to Parmigianino at Naples, to the hideous caricature published in De Bry. The small panel belonging to Dr. Alessandro de Orchi is, therefore, priceless.

The third part contains diplomatic correspondence from Venetian and other Italian orators (ambassadors) relating to Columbus, and the letters of Pietro Martire, Vespucci, Vianello, Marino Sanuto, and others. In the fourth part we have an admirable series of essays by the well-known traveller D'Albertis on the ships of the Middle Ages, as an introduction to a description of the ship and caravels of the first voyage, and essays on early cartography, on the observations made by Columbus, and on the instruments used in his time. Signor Bertelli contributes a very learned dissertation on the discovery of the variation of the compass.

The fifth part has not yet reached us, but it will comprise monographs on the Italian precursors and continuators of the work of the great Genoese, such as Toscanelli, Pietro Martire, Vespucci, Caboto, Verrazzano, Pigafetta, and Benzoni. It will comprise three volumes of great interest; and the sixth and last part is an elaborate bibliography of the works relating to Christopher Columbus and the discovery of America.

This is indeed a noble and imperishable monument to a great man. It will endure for centuries after all the carping criticism on the words and acts of Columbus has been forgotten, except for the few notices preserved to point a moral in its pages. It was a most happy idea, and Italy is to be congratulated on having a Government sufficiently enlightened to undertake so good a work, and so many learned sons ready and willing to devote their time and talents to advance the honour of their country. As President of the Geographical Society of a nation which has owed much to Italy, it is alike a duty and a pleasure to offer on the part of my associates, as well as on my own part, our most hearty congratulations to our Italian friends on the completion of their magnificent Colombian enterprise.

THE GEOGRAPHY OF MAMMALS.

By W. L. SCLATER, M.A., F.Z.S.

No. II.—The Australian Region.*

Sect. 1.—Boundaries of the Australian Region.

The Australian Region includes Australia, New Guinea, and the Moluccas, together with all the Pacific Islands and New Zealand. It is divided from the Oriental, the next adjacent region, by a line drawn

* Continued from vol. iii. p. 105. Map, p. 96.

between the two small islands of Bali and Lombok (called Wallace's Line), and thence through the Flores and Molucca Seas, between the islands of Celebes on the one side, and Sumbawa, Flores, Bouru, Sula, and Gilolo on the other. All the islands westwards of this line (*i.e.* Bali, Java, Sumatra, Borneo, Celebes, and the Philippines) are included in the Oriental Region; while all the islands to the eastwards, from Lombok to Timor, the Moluccas, and New Guinea, are referred to the Australian Region. Besides this, the Australian Region includes all the islands of the Pacific, from the Pelews and Ladrones in the north-west, to the Sandwich Islands in the north-east, the Marquesas in the south-east, and New Zealand and its neighbouring islands in the south-west.

The boundaries, as above given, correspond with those laid down by Wallace in his work on Geographical Distribution, with the exception that the island of Celebes has been transferred to the Oriental Region.

Celebes, as Mr. Wallace has fully shown in his 'Island Life' (14), is an anomalous island presenting a very difficult problem. It has, doubtless, relations to both the Oriental and the Australian Regions, but has besides many peculiar forms inhabiting it, which do not seem to connect it with either region. On the whole, however, the evidence of the mammals, at any rate, serves to connect it more closely with the Oriental Region, as will be seen by the discussion of the subject in the chapter dealing with that region.

Sect. 2.—General View of the Mammal-Fauna of the Australian Region.

The peculiarities of the Australian Region are very striking. Within its boundaries are found the only representatives of the lowest and most reptilian of the orders of mammals; these are the egg-laying forms, *Ornithorhynchus*, *Echidna*, and *Proechidna*, which constitute the order Monotremata (12).

Of the seven generally recognized families of marsupials, or "pouched animals," no less than six are entirely confined to the Australian Region, with the exception of two species of phalanger (*Phalanger ursinus* and *P. celebensis*), which have crossed the boundary into Celebes. The seventh family, the *Didelphyidæ*, or true opossums, are found only in the Neotropical Region, whence they have intruded into the southern part of the Nearctic Region.

Of the other mammals, the rodents and the bats are the only orders at all adequately represented in the Australian Region. To the former belong six genera of *Muridæ* (mice), all of which, except the wide-ranging *Mus*, are confined to this region; the only other rodent that occurs in it is the Javan porcupine, which has just crossed the dividing-line between the Oriental and Australian Regions into the islands of Flores and Sumbawa.

The bats of the Australian Region (3) are very numerous, more

especially in the islands to the north of Australia, where the tropical conditions are specially favourable to the development of this group. No less than twenty-eight genera, containing nearly one hundred species of bats, are met with within the region, and of these genera eight are not found elsewhere. This is a high percentage, only excelled in the Neotropical Region, which is extraordinarily rich in bats, having no less than forty-two out of forty-seven genera confined to it.

The five other orders of terrestrial mammals—the Ungulata, the Carnivora, the Insectivora, the Edentata, and the Quadrumana—may be considered as practically absent in the Australian Region, though members of several wide-ranging genera have just crossed the line of separation, and are represented in some of the islands on the north of Australia; but, with the exception of the dingo, none of these reach the actual continent of Australia.

The question of the origin of the dingo has not yet been settled. Although fossil remains of this animal have been found in the recent Tertiary deposits, it is difficult to say whether the dingo was introduced into Australia by the aborigines or is indigenous. At the present time it appears to be found both in a wild state and in a semi-domesticated condition among the native Australians.

Sect. 3.—Subdivision of the Australian Region.

The Australian Region may be most conveniently divided into five subregions; these are—

(1) The *Austral Subregion*, containing—The island-continent of Australia, with the dependent island Tasmania.

(2) The *Papuan Subregion*, containing—The islands lying to the north of Australia, including (*a*) the Timor group from Lombok to Timor-Laut; (*b*) the Moluccas, of which the chief islands are Morty, Batchian, Gilolo, Bouru, and Ceram; (*c*) the large island of New Guinea; (*d*) the New Britain group, containing New Britain, New Ireland, the Admiralty Islands, and the Solomon group.

(3) The *Maorian Subregion*, containing—The two islands of New Zealand, together with their outliers Norfolk, Kermadec, and Chatham Islands, as also Auckland, Campbell, and Macquarie Islands.

(4) The *Polynesian Subregion*, containing—The various islands in the Pacific from the Ladrones in the north-west to the Society and Marquesas in the south-east, of which the principal are New Caledonia, the New Hebrides, and the Fiji and Samoan groups.

(5) The *Hawaiian Subregion*, containing—The Sandwich-Island group.

Of these, only the first two, the Austral and Papuan Subregions need be considered in detail, as there are, practically speaking, no mammalian inhabitants, except bats, in the other three subregions.

Sect. 4.—The Austral Subregion.

The "island-continent" of Australia, as Mr. Wallace terms it, has, as has now been positively ascertained, a large portion of its interior so parched up and barren as to be almost destitute of animal life. But all along the east and south-east coasts, where there is land of sufficient elevation to condense the vapours from the adjoining ocean, more fertile districts are found. Besides the more widely diffused Australian types, some peculiar forms are met with only on this side of the continent. Tasmania, which is, in fact, but a recently separated piece of this portion of Australia, has also a moister and less extreme climate, and contains representatives of many of the special Australian forms, besides some indications of an antochthonous fauna.

The most peculiar mammals of Australia, and those which first claim our attention, are the two forms which together constitute the subclass of monotremes. These are the extraordinary genera *Ornithorhynchus* *Echidna*, which in their toothless jaws, in the conformation of their sternum and shoulder girdle, and especially in the structure of their reproductive organs, exhibit unmistakable signs of divergence towards the classes of reptiles and amphibia. The first of these, usually known to the colonists as the "water-mole," is entirely aquatic in its habits, and is met with only in the streams and waterholes of New South Wales and Tasmania, where it burrows in the banks, and swims and dives with great facility. The Echidna is more widely distributed, and, as we shall presently see, has also representatives in the Papuan Subregion. It inhabits the scrubs throughout the eastern districts of Australia, and is likewise occasionally found as far along the southern coast as Western Australia. In Tasmania a slightly different species (*Echidna setosa*) with longer fur, almost concealing the spines (by some authors considered to be only a geographical race or subspecies of the typical form), is met with.

After the monotremes, the most important group of mammals, and that which constitutes by far the most prevalent feature of Australian mammal-life, is the great order of marsupials. Although not absolutely restricted to Australia, since one of its component families is purely American, the marsupials, from their prevalence, constitute a still more noticeable feature of the Australian fauna than the monotremes. Of the seven families into which this order is usually divided by naturalists, six are entirely confined to the Australian Region. Moreover, the marsupials are so abundant in Australia proper, as to quite overshadow the few representatives of the higher orders of mammals found within its limits.

The carnivorous dasyures (*Dasyuridæ*) forming the first of these families take the place in Australia of the true carnivora of other parts of the world. They are semi-nocturnal in habits, and prowl about at

dusk in search of the smaller mammals and birds which constitute their food. In Tasmania two peculiar forms of dasyures occur, which are not met with in the Australian continent. These are the thylacine, a dog-like animal with a long tapering tail, noticeable as being the largest of living carnivorous marsupials, and in general external appearance so much resembling our familiar domestic friend that the uninitiated can hardly be persuaded that its proper place is in a different order of mammals; and the Tasmanian devil, as it is popularly called—a somewhat aberrant dasyure of a prevailing black colour, about the size and somewhat of the shape of an English badger, and remarkable for its savage and voracious disposition. Both these animals, now confined to the islands of Tasmania, must have formerly extended into Australia, as their remains have been found fossil in the caves of the Wellington Valley of New South Wales. Altogether the dasyures number some twenty species in Australia and Tasmania.

Besides the dasyures, a second type of the same family, but in many respects divergent in structure, is found on the mainland of Australia. This is the *Myrmecobius*, or "native ant-eater," as it is called—a little animal of the size and somewhat of the likeness of the common squirrel, with a long bushy tail and elegant transverse stripes across the back. The *Myrmecobius* is terrestrial in its habits, and feeds principally on ants. It is apparently confined to the western and central parts of the subregion.

The *Peramelidæ*, or bandicoots, the second family of Australian marsupials, have also teeth adapted to an insectivorous diet, although we know, from the records of trustworthy observers, that some of the species feed more or less upon vegetable substances. Such is certainly the case with the root-eating dalgyte (*Peragale lagotis*) of Western Australia, which is abundant over the grassy plains of that colony, and, from its burrowing habits and large hare-like ears, is commonly known as the "native rabbit." Of the typical bandicoots (*Perameles*), five or six species are known, distributed over various portions of Australia, each colony having its peculiar forms. They are all purely terrestrial animals, some inhabiting the densest scrubs, and others the hot stony ridges of the upland plains. The only remaining member of the family *Peramelidæ* is the anomalous pigfoot (*Chœropus castanotis*), a small rat-like animal with slender feet, which is confined to the hard stony grounds of the interior of the southern Australian colonies.

A most interesting discovery has recently been made in the deserts of Central Australia of a new burrowing marsupial, of mole-like habits, for which it is necessary to constitute a new family. This little animal has been described by Dr. E. C. Stirling (9) under the name of *Notoryctes typhlops*, and is apparently very rare. As its name implies, it is quite blind, its eyes being represented merely by pigment-spots buried beneath the skin and muscles; furthermore, its whole structure

is admirably adapted for its burrowing life. Full descriptions of both its habits and anatomy will be found in the *Transactions* of the Royal Society of South Australia for 1891.

We now come to the herbivorous marsupials (*Diprotodontia*), of which there are three families, all confined to the Australian Region, namely, the wombats (*Phascolomyidæ*), the phalangers (*Phalangeridæ*), and the kangaroos (*Macropodidæ*).

The wombats are numerically of the least importance of the three families above mentioned, although the form and general appearance of the animals of the single known genus, *Phascolomys*, is hardly less remarkable than that of the kangaroos.

There are three species of wombat generally recognized, one of which is confined to Tasmania; they are clumsy-looking animals, resembling in their form and actions small bears. They never climb trees, but live entirely on the ground or in burrows and holes, feeding on grass, roots, and other vegetable substances. In general structure the wombats are closely allied to the next family, the phalangers, although their exclusively terrestrial habits naturally involve minor points of difference, which, added to the characters presented by their dentition, have induced naturalists to recognize them as a separate family.

The phalangers (*Phalangeridæ*), which next follow, are a much more extensively developed group of animals, presenting us with several well-marked generic forms, and with about twenty-one readily distinguishable species in the Australian mammal-fauna.

While the kangaroos are mostly grazing animals, and the wombats burrowers and grubbers, the phalangers are essentially arboreal in their habits, and are much more strictly nocturnal than the two former groups. In the daytime the phalangers lie concealed in the hollows of trees, issuing forth at night to feed amongst the branches upon leaves, buds, and fruits. The koala, or "native bear" (*Phascolarctos*), of which form a single isolated species only is known, serves to connect the phalangers with the wombats, being allied to the latter by many characters, and amongst others by the absence of a tail, which distinguishes it from the rest of its family. In *Pseudochirus*, *Trichosurus*, and *Dromicia*, the more typical forms of the *Phalangeridæ*, which next follow, the tail is not only well developed, but of vital importance to the animal, being used as a prehensile organ. The flying phalangers of the genera *Petaurus* *Gymnobelideus*, and *Acrobates*, do not employ their caudal appendages in the same way. But this organ, which is much elongated in all these groups, and densely clothed with hair, serves, along with the membrane extended between the fore and hind legs, in the manner of the flying squirrels (*Pteromys*), to support the animal in the air when descending from the top of one tree to the base of another.

One more very singular little animal must be enumerated before we leave the phalanger family—the tarsipes (*Tarsipes rostratus*), small in

size, but great in interest, even among the many abnormal forms of this wonderful land. The tarsipes is of the size and general form of an ordinary mouse, but with a long slender pointed muzzle, and with the nails of the toes for the most part embedded in the upper surface of the expanded fleshy pads, with which they are terminated, thus affording some resemblance to the abnormal lemuroid mammal, *Tarsius spectrum* of the Indian Archipelago, whence its name is derived. Another peculiarity of the tarsipes is that its food appears to be exclusively honey, no other substance having been found in the stomachs of the specimens examined, and its long and slender tongue being obviously adapted, like the bill of the humming-bird and the brush-tongue of the lories, for collecting such food.

The kangaroos (*Macropodidæ*) must be considered as *par excellence* the most important group of the Australian mammal-fauna. They are at once the most numerous in species, and in the former condition of Australia, before the influx of Europeans took place, were probably likewise the most prevalent form of mammalian life as regards individuals. In his great work on the mammals of Australia, Mr. Gould has devoted the whole of the second volume to the illustration of members of this family, figuring no less than 44 species. Mr. Thomas, in his recent catalogue of the Marsupialia (12), recognizes 45 species.

These are divided into eleven genera, of which the best known and largest are *Macropus*, *Dendrolagus*, and *Bettongia*. The first of these genera contains the larger kangaroos, in which the upper incisors are of equal length, the canine teeth are deciduous when present, and all the toes of the fore feet are of nearly equal length. *Dendrolagus* includes four species of tree-kangaroos, of which, however, only one is found in Australia, *Dendrolagus lumholtzi* (2, 6) of Northern Queensland, the others being confined to New Guinea. They are remarkable for the fact that the proportionate lengths of the fore and hind limbs, unlike those of the true kangaroos, resemble those of ordinary mammals; they further differ from all other kangaroos in being arboreal in their habits, climbing trees with great facility, and living on bark, fruits, and leaves.

Bettongia and its allied genus *Potorous* embrace the kangaroo-rats, as they are often termed. These are all small, never exceeding a rabbit in size; they possess well-developed canine teeth, and have the central toes of the fore feet elongated to accommodate their digging habits.

Having completed our survey of the monotremes and marsupials of the Australian Subregion, we must now consider the Eutherian series, which, as has been already shown, plays a very subordinate part in this extraordinary fauna. Putting aside the marine mammals—the seals, cetaceans, and sirenians—and confining our attention to the terrestrial groups, we find only three of the usually recognized orders, namely, the rodents, bats, and carnivores, with any representatives in this

strange country. And the carnivores would be perhaps better considered as quite external to the fauna of Australia proper, since the solitary member of this group found within its limits is the semi-domesticated dingo, which, as already suggested, has not improbably been introduced by the primitive native inhabitants.

Monkeys, insectivores, and the most useful order ungulates, to which its grassy plains would appear to be and, as we know by actual experience are, excellently adapted, are alike unknown, except as introductions, in Australia, and their functions in a state of nature seem to be performed by the various groups of marsupials.

Of the other orders, the rodents are represented by six genera, all belonging to the mice (*Muridæ*). Of these four are confined to Australia proper, while two others also occur in the Papuan Subregion; the remaining one, the cosmopolitan *Mus*, or true mouse, numbers no less than eighteen species in Australia. The habits of the water-voles of Europe are assumed by the species of the genus *Hydromys*, which are modified for aquatic life (Thomas, 13), while the species of *Hapalotis* are found chiefly in the dry sandy scrubs.

The bats, with one exception, all belong to genera of considerably wide distribution, and the number of species known to inhabit Australia is not very great. Thirty only are described in Dr. Dobson's catalogue of bats as coming thence. *Pteropus*, the great genus of fruit-eating bats, is represented by a few species; so too are the widespread insectivorous genera *Vesperugo* and *Miniopterus*. One species of the former genus, the southern pipistrelle (*V. abramus*), is found almost throughout the Old World, from Sweden to North Australia.

Sect. 5.—Analysis of the Austral Mammal-Fauna.

The full list of the mammalian fauna of the Austral Subregion (7) contains the names of about 169 species, referable to 59 genera. Of these genera 29, just half, are not found outside the Austral Subregion, the greater number of them (twenty-five) being marsupials; they include, however, three genera of mice (*Xeromys*, *Hapalotis*, and *Mastacomys*) and one peculiar bat (*Rhinonycteris*). Thirteen genera are confined to the Australian Region, that is, are found in the Papuan Subregion as well as in the Austral Subregion; of these, again, the majority are marsupials, besides which there are two genera of rodents (*Hydromys* and *Uromys*), and one bat (*Nyctophilus*). Seventeen genera which are found in Australia extend beyond the limits of the region, to the Oriental, and in some cases range even into the Ethiopian and Palæarctic Regions. Of these the greater number (fourteen) are bats; one is a marsupial (*Phalanger*), of which two species are found in Celebes; another is the widely spread genus *Mus*, which is found throughout the Old World; and the last is a carnivore (*Canis*), of which the

Australian representative is the dingo. *Canis* is spread over the whole of the rest of the world, both Old and New.

Turning now to the distribution of the genera within the continent of Australia itself, it will be found that out of 43 genera (of monotremes, marsupials, and rodents), 20 are fairly represented throughout the whole area, 13 are confined to the east (several of these ranging north into New Guinea), 7 are restricted to the western and central parts of the continent (these latter are chiefly desert forms such as *Peragale*, *Chœropus*, and *Notoryctes*), and the three remaining genera are found only in Tasmania. These are *Thylacinus*, *Dasyurus*, and *Mastacomys*.

If now we reconsider the list, counting only monotremes, marsupials, and rodents, it will be found that out of 130 species, 35 range from west to east to a greater or less extent; 49 are confined to the eastern part of Australia, in many cases extending to Tasmania; and 36 are peculiar to Western Australia, while 10 species out of the total mammal-fauna are peculiar to Tasmania.

Sect. 6.—Past History of the Austral Subregion.

The past history of the Australian mammals is still very obscure; the only remains of extinct species yet discovered have been found in certain bone-caves and in surface-deposits generally attributed to the Pleistocene age.

Putting aside the dingo, all the Pleistocene mammals of Australia belong to the monotremes or to the marsupials, and, with two exceptions, can be accommodated in still existing families. These exceptions are *Nototherium* and *Diprotodon*, the latter of which was a very large animal, equalling a rhinoceros in bulk: but both were probably allied to the existing kangaroos.

Recently a deposit containing bones of these and other large marsupials has been found in a dry salt lagoon, called Lake Mulligan, in South Australia, and when these remains have been worked out, a great deal more information may be expected as regards this pliocene or pleistocene fauna. As in South America, these extinct animals appear in many cases to have attained a size far surpassing that of their degenerate descendants.

None of the remains hitherto found in Australia throws any light on the origin of its remarkable fauna. But quite recently evidence of an extensive mammalian fauna has been discovered in certain beds, of probably Upper Eocene age, near Santa Cruz, in Patagonia. In addition to a number of other forms, this series contains remains of a large proportion of marsupials, and though the most prominent of these forms belong to the *Didelphyidæ*—the marsupial family now confined to America, and apparently distributed over the whole northern hemisphere during Tertiary times, but not found in Australia—a certain number of them show an Australian stamp. Some of them have even been relegated by

Ameghino (1), to whose researches our knowledge of the Santa Cruz fauna is mainly due, to the existing Australian family *Dasyuridæ*.

If, on further investigation, these references are found to be correct, the inference would seem to be that in very remote times—probably in the early Tertiary or the late Secondary Period—there has been some sort of land connection between South America and Australia. In such case there would be no necessity to suppose that Australia was ever directly connected with the rest of the Old World at all, none of the peculiar forms of Australian marsupials having yet been detected in any other part of the globe.

Besides the common possession of marsupials, many other resemblances between the faunas of Australia and South America have been pointed out to occur among the birds and amphibians, and especially among the fishes. Two families of freshwater fishes (*Galaxiidæ* and *Haplochitonidæ*) are found exclusively in these two regions, and are not known to occur elsewhere.

Apart from speculation, however, there is no question that Australia has been isolated from all the other continents since the end of the Secondary, or at least since the beginning of the Tertiary, Period of geological time.

Sect. 7.—The Papuan Subregion.

In contrast to Australia, the great island of New Guinea, or Papua, is traversed throughout by mountains of high altitude. The rivers rising in these ranges, aided by the suns of the tropics, produce a luxuriant vegetation, and such a country as we should suppose would be especially favourable to mammal life. Yet mammals are by no means abundant in New Guinea and the adjacent islands which constitute the Papuan Subregion. As is the case in Australia, the greater number of the indigenous animals of New Guinea and the neighbouring islands consist of monotremes, marsupials, and rodents, together with a certain number of the cosmopolitan order of bats (8, 10, 11).

Of the monotremes, two species have been met with in New Guinea, both of them belonging to the family of echidnas above referred to. Of these one species, only at present known from the south of New Guinea, is but a slightly modified form of the small Australian echidna. But in the mountains, in various parts of New Guinea, has been lately discovered a larger representative of the same order (*Proechidna*), which moreover, differs from the typical form in having only three toes on its fore limbs, and in other particulars.

The Papuan marsupials, as yet discovered, are about thirty-three in number, and embrace representatives of the dasyures, bandicoots, phalangers, and kangaroos, which are also characteristic families of the Australian mammal-fauna.

There are only two genera of marsupials peculiar to the Papuan

region. One of these is *Distachurus*, a small mouse-like animal belonging to the family of phalangers, and remarkable for its long tail, which bears at its tip a double row of hairs on either side, and thus resembles a feather. The other genus is *Dorcopsis*, containing three species of animals somewhat nearly allied to the true kangaroos. A third genus (*Dendrolagus*), containing kangaroos, specially modified for arboreal life, was formerly supposed to be peculiar to New Guinea. But a species of the same form, as already mentioned, has been ascertained of late years to exist in Northern Queensland also, thus giving further proof of the similarity of the Papuan and Austral mammal-faunas.

Nearly all the marsupials found in the Papuan Subregion are confined to the island of New Guinea; a few, however—for example, the phalangers—also inhabit the other islands of this subregion. The common grey cuscus (*Phalanger orientalis*) extends from Amboyna in the Moluccas and from Timor all across New Guinea, and as far east as New Britain and the island of San Christoval in the Solomons. As regards the remaining orders of mammals, a few scattered representatives of the higher forms (Ungulata, Insectivora, and Carnivora) are found in the islands of the Papuan Subregion. Some of these have, undoubtedly, been introduced by the Malays from the neighbouring islands of the Oriental Region; but others have been described by naturalists as peculiar species. In the latter case, if we assume that the specific distinctions have been satisfactorily established, it is not probable that such species have been brought into the Papuan Region by the hand of man. It is more likely that they have migrated into it at an earlier period, since a considerable lapse of time is necessary before the effects of isolation can produce a new race of sufficient distinctness from the original form to be entitled to specific separation. As regards the Papuan ungulates, several kinds of wild swine (*Sus*) are stated to be met with in the Papuan Region. How far these differ from one another, and whether they are really distinct from the allied wild pigs of the Oriental Region, seems a little uncertain. It is probable, however, that many of these so-called "species" of wild pig may be descendants of the domestic animal, which has run wild, as is well known, in many of the Pacific Islands. The other representatives of the order Ungulata found in the Papuan Subregion are three species of deer belonging to what is termed the Rusine group of the genus *Cervus*. Two of these deer are confined to Timor and the Moluccan group of islands respectively. All three are closely allied to the Javan deer (*Cervus hippelaphus*), and it is quite possible that they are merely dwarfed forms of this species.

Passing over, for the present, the rodents and bats, the Carnivora are represented in the Papuan Region by three species. These are a cat (*Felis megalotis*), of which very little is known, but which is stated by Mr. Jentink to be quite a distinct species, and to be confined to the islands of Timor and Rotti; a palm cat (*Paradoxurus hermaphroditus*),

Ameghino (1), to whose researches our knowledge of the Santa Cruz fauna is mainly due, to the existing Australian family *Dasyuridæ*.

If, on further investigation, these references are found to be correct, the inference would seem to be that in very remote times—probably in the early Tertiary or the late Secondary Period—there has been some sort of land connection between South America and Australia. In such case there would be no necessity to suppose that Australia was ever directly connected with the rest of the Old World at all, none of the peculiar forms of Australian marsupials having yet been detected in any other part of the globe.

Besides the common possession of marsupials, many other resemblances between the faunas of Australia and South America have been pointed out to occur among the birds and amphibians, and especially among the fishes. Two families of freshwater fishes (*Galaxiidæ* and *Haplochitonidæ*) are found exclusively in these two regions, and are not known to occur elsewhere.

Apart from speculation, however, there is no question that Australia has been isolated from all the other continents since the end of the Secondary, or at least since the beginning of the Tertiary, Period of geological time.

Sect. 7.—The Papuan Subregion.

In contrast to Australia, the great island of New Guinea, or Papua, is traversed throughout by mountains of high altitude. The rivers rising in these ranges, aided by the suns of the tropics, produce a luxuriant vegetation, and such a country as we should suppose would be especially favourable to mammal life. Yet mammals are by no means abundant in New Guinea and the adjacent islands which constitute the Papuan Subregion. As is the case in Australia, the greater number of the indigenous animals of New Guinea and the neighbouring islands consist of monotremes, marsupials, and rodents, together with a certain number of the cosmopolitan order of bats (8, 10, 11).

Of the monotremes, two species have been met with in New Guinea, both of them belonging to the family of echidnas above referred to. Of these one species, only at present known from the south of New Guinea, is but a slightly modified form of the small Australian echidna. But in the mountains, in various parts of New Guinea, has been lately discovered a larger representative of the same order (*Proechidna*), which moreover, differs from the typical form in having only three toes on its fore limbs, and in other particulars.

The Papuan marsupials, as yet discovered, are about thirty-three in number, and embrace representatives of the dasyures, bandicoots, phalangers, and kangaroos, which are also characteristic families of the Australian mammal-fauna.

There are only two genera of marsupials peculiar to the Papuan

region. One of these is *Distachurus*, a small mouse-like animal belonging to the family of phalangers, and remarkable for its long tail, which bears at its tip a double row of hairs on either side, and thus resembles a feather. The other genus is *Dorcopsis*, containing three species of animals somewhat nearly allied to the true kangaroos. A third genus (*Dendrolagus*), containing kangaroos, specially modified for arboreal life, was formerly supposed to be peculiar to New Guinea. But a species of the same form, as already mentioned, has been ascertained of late years to exist in Northern Queensland also, thus giving further proof of the similarity of the Papuan and Austral mammal-faunas.

Nearly all the marsupials found in the Papuan Subregion are confined to the island of New Guinea; a few, however—for example, the phalangers—also inhabit the other islands of this subregion. The common grey cuscus (*Phalanger orientalis*) extends from Amboyna in the Moluccas and from Timor all across New Guinea, and as far east as New Britain and the island of San Christoval in the Solomons. As regards the remaining orders of mammals, a few scattered representatives of the higher forms (Ungulata, Insectivora, and Carnivora) are found in the islands of the Papuan Subregion. Some of these have, undoubtedly, been introduced by the Malays from the neighbouring islands of the Oriental Region; but others have been described by naturalists as peculiar species. In the latter case, if we assume that the specific distinctions have been satisfactorily established, it is not probable that such species have been brought into the Papuan Region by the hand of man. It is more likely that they have migrated into it at an earlier period, since a considerable lapse of time is necessary before the effects of isolation can produce a new race of sufficient distinctness from the original form to be entitled to specific separation. As regards the Papuan ungulates, several kinds of wild swine (*Sus*) are stated to be met with in the Papuan Region. How far these differ from one another, and whether they are really distinct from the allied wild pigs of the Oriental Region, seems a little uncertain. It is probable, however, that many of these so-called "species" of wild pig may be descendants of the domestic animal, which has run wild, as is well known, in many of the Pacific Islands. The other representatives of the order Ungulata found in the Papuan Subregion are three species of deer belonging to what is termed the Rusine group of the genus *Cervus*. Two of these deer are confined to Timor and the Moluccan group of islands respectively. All three are closely allied to the Javan deer (*Cervus hippelaphus*), and it is quite possible that they are merely dwarfed forms of this species.

Passing over, for the present, the rodents and bats, the Carnivora are represented in the Papuan Region by three species. These are a cat (*Felis megalotis*), of which very little is known, but which is stated by Mr. Jentink to be quite a distinct species, and to be confined to the islands of Timor and Rotti; a palm cat (*Paradoxurus hermaphroditus*),

and a civet (*Viverra tangalunga*). Of these two last the palm-cat is found in both the Moluccas and the Timor group, the civet only in the Moluccas. These two animals have in all probability been introduced by the Malays, since they are frequently kept by them as pets in captivity.

The order Insectivora is represented in the Papuan Subregion by about five species of small shrews (*Crocidura*), but so far as is yet known these occur only in the Moluccas and in Timor, and do not reach further east. Lastly, two species of monkey just enter the margin of the subregion, namely, the common macaque (*Macacus cynomolgus*), very widely distributed throughout the Oriental Region, which has crossed "Wallace's Line" into Flores and Timor; and the black ape of Celebes (*Cynopithecus niger*), which has passed the narrow straits between that island and Batchian, one of the Molucca group.

The rodents are represented in the Papuan Subregion by a considerable number of rats and mice of the family *Muridæ*, all of them restricted to the subregion. One of these, remarkable for its peculiar and probably prehensile tail, is found only in the mountains of New Guinea, and has been placed in a new genus (*Chiuromys*). Among the rodents also there is one very obvious intruder from the west; this is the Javan porcupine (*Hystrix javanica*), which in this subregion is found only in Timor, but is very widely distributed thoughout the Oriental Malayan Islands.

Finally, the Papuan Subregion, with its luxuriant vegetation and tropical forests, seems to be extremely favourable to the presence of bats, of which there are more than 60 species known to occur within its limits. More especially is this the case with the large fruit-eating bats of the genus *Pteropus*, since about 20 out of the 40 known species of this genus are found within this subregion. This genus (*Pteropus*) has an extraordinary area of distribution, which it is difficult to account for satisfactorily. Its range extends from Madagascar and the neighbouring Mascarene Islands through the Seychelles to India, Ceylon, Burma, and the Malayan Archipelago, and includes even Southern Japan; thence it is continued over all the Papuan Subregion into Australia and most of the Polynesian Islands. This genus, it may be noted, seems to have a special propensity to peculiar development in insular areas. Out of about 40 species of *Pteropus* as yet known, only two (*Pteropus medius* from India, and *Pteropus edulis* of the Malay Peninsula) are found on the main continental mass; all the other species are confined to islands, and in many cases to very small limits. For instance, one species (*P. livingstonii*) is restricted to the Comoro Islands in the Indian Ocean, three others to single islands in the Solomon group, and a fourth is only known from the island of Lombok.

Sect. 8.—Analysis of the Papuan Mammal-Fauna.

The number of genera of mammals represented in the Papuan Subregion is 50; of these 8 are restricted to the subregion (namely, *Proechidna*, *Distachurus*, *Dorcopsis*, *Chiuromys*, *Pteralopex*, *Nesonycteris*, *Melonycteris*, and *Anthops*). There are also 12 genera, nearly all marsupials, common to the Papuan Subregion and Australia; and 16 genera common to the Papuan Subregion and the Oriental Region. Of these, however, only 6 (*Sus* and 5 genera of bats) penetrate so far eastwards as New Guinea; the other 10 are stragglers over "Wallace's Line" as far as the Timor group and the Moluccas only. Thirteen genera (*Phalanger*, *Mus*, and 11 genera of bats) are found in both the Oriental Region and the Papuan and Austral Subregions.

Sect. 9.—The Maorian Subregion.

The Maorian Subregion includes, besides New Zealand proper, many smaller groups of islands in the sea around, such as Norfolk Island, the Kermadec group, Chatham Island, Stewart Island, Auckland Island, Campbell Island, and Macquarie Island, and probably Lord Howe's Island, though in some respects this appears to belong rather to the Australian mainland than to New Zealand.

As in the Polynesian Subregion, there are no indigenous terrestrial mammals found in this Subregion, the only exception being a species of rat (*Mus maorium*). But it is quite possible, nay, probable, that this rat, as its name seems to imply, was brought by the invading Maoris into New Zealand from Tonga, or from wherever the Maoris originated; indeed, Mr. Thomas believes it to be identical with a Polynesian species, *Mus exulans* (cf. Buller, *Trans. N. Z. Inst.*, xxv. p. 49). The only two bats recorded from New Zealand are *Mystacina tuberculata*, the species as well as the genus being both restricted to New Zealand; and *Chalinobus morio*, which is also found in Australia.

The islands of New Zealand are indeed remarkable as being the only insular area on the globe, of any considerable size, which are entirely destitute of mammal-life. All the other large islands of the world possess a mammal-fauna of greater or less richness, related to the continent to which they are nearest, and have consequently been termed by Mr. Wallace "continental islands." All such "continental islands" are separated by narrow seas, of no great depth, from their respective continents. New Zealand alone, of all the larger islands of the globe, is disconnected by a considerable breadth of ocean (about 1400 miles) and also by a deep sea (more than 2000 fathoms) from the nearest point of mainland.

This fact and the absence of an indigenous mammal-fauna show that New Zealand has not been joined directly by land with Australia

recently, even in a geological sense of that term; possibly it has never been so connected at all.

To determine, therefore, the geographical affinities of this subregion, we must turn to the birds and to the other lower groups, and so endeavour to gain an idea of the affinities of these interesting islands. In New Zealand the want of mammals has been apparently supplied in former epochs by the great development of two families of flightless birds. One of these groups, the kiwis (*Apterygidæ*), is still represented by five or six species, although these birds are being rapidly exterminated by the British colonists. The other group, the moas (*Dinornithidæ*), are now quite extinct, but as remains of their skin and feathers have been found in some of the caves of the Southern Islands, and as the ancient legends and songs of the Maoris contain unmistakable references to them, it is probable that they have ceased to exist only within the last few hundred years.

In addition to the flightless birds, recent and extinct, New Zealand still possesses two very singular forms of parrots (*Nestor* and *Stringops*), for the reception of which special families have been formed; and eighteen other peculiar genera of land-birds, most of which are related more or less remotely with Australian forms. Altogether there are in New Zealand 57 land-birds, belonging to 34 genera, of which 16, or nearly half, are not known elsewhere. There are also five peculiar genera of waders and aquatic birds in New Zealand, making 21 indigenous genera in all. Among its few reptiles, also, New Zealand numbers the very remarkable tuatera (*Sphenodon punctatus*), which, though externally resembling a lizard, differs from all other lacertians in so many points of its skeleton and internal structure that it is usually considered to belong to a separate and distinct order of reptiles. The nearest allies of this form are found among three extinct families which make up the order *Rhynchocephalia*. Remains of these families occur in beds of Permian age in Germany, in the Keuper of Elgin (Scotland), and in the (probably contemporaneous) Gondwana beds of India, as likewise in the lower Eocenes of North America and Northern Europe.

All these facts indicate a great amount of individualism in the Maorian Subregion. But on the whole they betray an affinity to the tropical parts of Australia and to the Papuan Subregion rather than to the temperate portion of Australia, to which New Zealand is now nearest in point of actual distance. This connection is further confirmed by the soundings of the seas round the islands, which show that, although on the west, south, and east deep water extends all round, a long submerged bank, with a depth of less than a 1000 fathoms, stretches along to the north-west, and connects the shallow waters round Australia with those round New Zealand.

It is probable that the land connection between the two areas, if it ever actually existed, took place somewhere along this line.

As already mentioned in the first article of this series, some writers on Geographical Distribution, especially Professor Huxley and Professor Newton, are inclined to give to New Zealand and its islands the rank of an independent region among the primary divisions of the globe. There is, no doubt, as has just been shown, a good deal to be said for this proposal; but, on the other hand, there are even more valid reasons for retaining New Zealand as a subregion of the Australian Region. In the first place, we are here dealing with mammals alone, and it seems rather absurd to assign the value of a primary region to a group of small islands characterized by the almost entire absence of that class of animals with which we are most concerned. In the second place, looking at regions from a more general point of view, there is a great practical convenience (as Mr. Wallace has pointed out) in keeping the more or less equal divisions of the globe as primary divisions. It seems, therefore, to be quite unnecessary to elevate so small a portion of the world into a primary region. Other small insular areas might, with some justice, put forward nearly similar claims. In the third place, although New Zealand possesses no indigenous terrestrial mammals, yet the fauna, such as it is, shows an unmistakable affinity of various degrees to that of Australia, and more especially to the tropical part of that continent. It is, indeed, probable that the whole of the fauna of New Zealand has been originally derived from that source, although in the greater number of cases it has undergone considerable modification.

Mr. H. O. Forbes (4) has lately put forward a speculative article on the former existence of a (now mostly submerged) southern continent, the remains of which are represented by the land round the South Pole, while former arms stretched upwards and embraced New Zealand, Eastern Australia, Tasmania, Madagascar, the Mascarene Islands, and part of South America. The grounds for this bold assumption, which, although by no means new, has not been previously developed to so great an extent, rest chiefly on the finding of the remains of a large ocydromine rail in the Chatham Islands, allied to the now extinct *Aphanapteryx* of Mauritius, and the fossil bones of a large coot (*Fulica*) allied to *F. newtoni* of the same island. Other evidence adduced is that of the occurrence of the *Ratitæ*, or struthious birds, in New Zealand, Australia, Madagascar, and Patagonia. But the distribution of struthious birds is probably to be explained much in the same way as the distribution of other archaic forms, such as the lemurs and tapirs. They are remnants of what were once more widely spread groups. That this is likely to be the case is shown by the recent discovery, in other parts of the world (such as the Sewaliks of India, and the Eocenes of England and France) of the remains of other extinct ratite birds.

Another piece of evidence brought forward by Mr. Forbes is the occurrence of *Didunculus* in the Samoan group, and of the dodo (*Didus*), to which *Didunculus* was once supposed to be nearly related, in Mauritius.

But it is now known that *Didunculus* has little or no affinity to the dodo, and that it is in fact a mere strongly modified member of the family Columbidæ.

Mauritius, as a matter of fact, is in every way a very typical oceanic island, and there seems to be little evidence, either physical or zoological, of its having been ever connected with any other land.

Sect. 10.—The Polynesian Subregion.

The Polynesian Subregion includes all the numerous and scattered island groups of the Pacific, from the Ladrones and Carolines in the west to the Marquesas in the east, with the exception of the Sandwich Islands, which, owing to their many peculiarities, must be kept apart as a separate subregion.

There is very little to be said concerning the Polynesian Subregion so far as mammals are concerned. As is always the case with oceanic islands—that is, islands that do not seem to have ever been directly connected with any of the great land masses of the globe—the mammal-fauna of Polynesia is practically non-existent, the only exception being a certain number of bats, which are creatures able to traverse the intermediate sea-areas, and so more resembling birds than ordinary mammals in their distribution.

There are, however, besides the bats, three species of the cosmopolitan genus *Mus* (mice and rats), recorded to occur in Polynesia, whether truly indigenous or the modified descendants of introduced species it is impossible to say.

Of the eleven species of bats which have been registered as Polynesian, eight are peculiar to the subregion, two extend into Papua, and one ranges even as far as the Oriental Region.

But, looking to the extreme poverty of the mammal-fauna, it is evident that, to ascertain the general character of the subregion, we must turn to the birds. These, as shown by the excellent summary of Polynesian ornithology recently compiled by Mr. Wiglesworth (15), are, considering the number of islands, not numerous, but on the whole show distinctly Australian affinities.

Sect. 11.—The Hawaiian Subregion.

The Hawaiian Subregion includes only the Sandwich Islands. This group of islands is situated in the northern part of the Pacific Ocean, and is very isolated, not only from the great land-masses of Asia and America, from which it is separated by a very deep ocean more than 2000 miles across, but also from the other larger groups of the Polynesian islands, such as Samoa and the Marquesas, from which it is parted by about the same distance.

The larger islands composing the group are seven in number, all of purely volcanic origin.

As would be naturally expected, there are no indigenous land-mammals in the Hawaiian Subregion, but a single species of bat (*Atalapha semota*) occurs there. This bat belongs to a genus found in America, and has, no doubt, reached the Sandwich Islands from that continent. The birds, however, to which we must turn for a moment in order to gain some idea as to the composition of the Hawaiian fauna, show extreme specialization. The greater number, not only of the species but even of the genera of this subregion, are peculiar and wholly restricted to these islands. It is, of course, among the smaller land-birds (*Passeres*) that this individuality is most marked; but even in the other groups, where the distribution is generally wider, the Hawaiian birds are, in many cases, local. We shall, however, be able to form a better general idea upon this subject when Mr. Scott Wilson's new work on the Hawaiian Avifauna (16), now in process of issue, has been brought to a conclusion.

As is the case with the birds, so with the land-shells, which have been carefully studied by the Rev. J. T. Gulick, a wonderful specialization is found in the Hawaiian fauna.

There are, therefore, ample grounds for making a separate subregion for this remote island group, notwithstanding its small size and the complete absence of mammalian life.

List of Authorities Referred to.

(1) Ameghino, F.—'Revista Argentina de Historia Natural.' Tomo 1 (1891).
(2) Collett, R.—"On some apparently New Marsupials from Queensland." *P.Z.S.*, 1884, p. 381, pls. xxix.–xxxii.
(3) Dobson, G. E.—'Catalogue of the Chiroptera in the Collection of the British Museum' (1878).
(4) Forbes, H. O.—"The Chatham Islands: their relation to a Former Continent." *R. Geogr. Soc. Suppl. Papers, III.*, pt. 4 (1893).
(5) Gould, J.—'The Mammals of Australia.' 3 vols. London (1845–63).
(6) Lumholtz, C.—"Notes upon some Mammals recently discovered in Queensland." *P.Z.S.*, 1884, p. 406.
(7) Ogilby, J. D.—'Catalogue of Australian Mammals.' Sydney (1892).
(8) Peters, W., and Doria, G.—"Enumerazione dei Mammiferi raccolti da O. Beccari, L. M. d'Albertis ed A. A. Bruijn nella Nuova Guinea propriamenta detta." *Ann. Mus. Civ. Stor. Nat. Genov.*, *XVI.*, p. 665, pls. v.–xviii. (1881).
(9) Stirling, E. C.—"Description of a New Genus and Species of Marsupialia, *Notoryctes typhlops*." *Trans. R. Soc. S. Austr.*, *XIV.*, p. 154, pls. ii.–ix. (1891). See also *op. cit.*, p. 283, pl. xii.
(10) Thomas, O.—"On the Bats collected by Mr. C. M. Woodford in the Solomon Islands." *P.Z.S.*, 1887, p. 320, pls. xxv. and xxvi.
(11) ——— "The Mammals of the Solomon Islands, based on the Collections of Mr. C. M. Woodford during his Second Expedition to the Archipelago." *P.Z.S.*, 1888, p. 470, pls. xx.–xxii.
(12) ——— 'Catalogue of the Marsupialia and Monotremata in the Collection of the British Museum.' London (1888).
(13) ——— "Description of a New Genus of *Muridæ* allied to *Hydromys*." *P.Z.S.*, 1889, p. 247, pl. xxix.

(14) Wallace, A. R.—'Island Life.' London (1880).
(15) Wiglesworth, L. W.—"Aves Polynesiæ: a Catalogue of the Birds of the Polynesian Subregion (not including the Sandwich Islands)." *Abth. K. Zool. Mus., Dresden*, No. 6 (1891).
(16) Wilson, S. B., and Evans, A. H.—'Aves Hawaiienses: The Birds of the Sandwich Islands.' Parts I.–IV., 4to. London (1890–93).

NOTE ON THE R.G.S. MAP OF TIBET.*

By GENERAL J. T. WALKER, R.A., C.B., F.R.S., Late Surveyor-General of India.

The map of Tibet which is now published has been under compilation in the office of the Geographical Society for several years. Portions have been published from time to time on various scales, to illustrate the reports of various travellers in this region which have been sent to the Society and read at the evening meetings. The publication of the map as a whole has been frequently delayed, in order to permit of the incorporation of new work, and the correction of old work as fresh materials became available from time to time. The map now contains all the latest information, which the scale ($\frac{1}{3800000}$, or 60 miles = 1 inch) is sufficiently large to show.

The materials on which it is based have been derived from the following sources:—

On the south, the information has been wholly taken from the Trans-Himalayan operations of the native explorers attached to the Indian Survey, notably Pundits Nain Singh and Krishna, whose explorations were published by the Society shortly after they were made. Nain Singh explored the Tibetan sources of the Indus, and a considerable portion of the upper course of the Yaro Tsanpo, or Brahmaputra river, in the years 1865–67, and in 1874–75 he explored a line of country stretching from west to east about 2° north of his previous work, from the eastern frontier of Ladakh to the Tengri-Nor Lake, and thence southwards to Lhasa. He eventually returned to India by a route over the eastern Himalayas, and through Bhotan into Assam.

Krishna, in the years 1879–82, took a line of exploration from Lhasa northwards into the Tsaidam plateau, along a route part of which had been taken by the Russian explorer, Prjevalski, in his attempts to reach Lhasa from the north; he then struck northwards to Sachu, or Saitu, in the plains of Mongolia to the north-east of Lob Nor. Returning to Tsaidam, he made his way through Eastern Tibet to the town of Darchendo, or Ta Chien Lu, which is situated on the high-road between Lhasa and Peking, and on the border-line between Tibet and China. He then turned westwards back to India, and, travelling *viâ* Batang, reached Sama in the Zayul valley of Tibet, not far from eastern Assam; but, being unable to pass through the wild tribes inhabiting the

* Map, p. 96.

intervening hills, he took a very circuitous route, northwards and westwards *viâ* Dongsar, Jithog, and Arig, to the vicinity of Lhasa, and then turned southwards and crossed the Himalayas into India. Krishna's route up to Tsaidam and thence down to Ta Chien Lu and Sama, and up again to the vicinity of Lhasa, has been adopted throughout; but for the country from Tsaidam northwards up to Sachu, the work of Messrs. Cary and Dalgleish has been taken in preference.

All the details to the west of the meridian of 82° have been taken from the maps of the Indian Survey.

The Khotan-Tarim river down to Chigalik and Lob Nor, the route from Chigalik over the Altyn Tagh and Chamen Tagh ranges to Bagh Tokai, and thence down to the Naichi valley in southern Tsaidam, and finally the route up to Sachu in Mongolia, are taken from the maps of Messrs. Cary and Dalgleish.

The Kuen Lun range between the meridians of 80° and 91°, and its lakes and northern spurs, have been taken from a Russian map by Pevtsof.

The Kuen Lun range between the meridians of 91° and 101°, together with some of the country to the south, and the Nan-Shan range of Mongolia to the north, have been taken from the last edition of Prjevalski's travels, published in St. Petersburg in 1888.

The route from Lob Nor to Sachu, and thence over the Ping Davan and Yangi Davan pass, and on to Lake Koko Nor across the plateau which lies to the south of the Nan Shan range, has been taken from the recently published map of Mr. St. George Littledale (see *Geographical Journal*, vol. iii. page 540).

A route from west to east across the Chang-tang of Tibet, lying to the north of Nain Singh's route of 1874–75, and stretching from north-eastern Ladakh into the region to the north of Lake Tengri Nor, has been taken from the map of Captain Bower's Survey in 1891.

A route between the meridians of 89° and 91°, from the Lob Nor country down to the neighbourhood of the Tengri Nor, has been taken from the map published by M. Bonvalot and Prince Henri of Orleans.

Information has been obtained from Mr. Rockhill's two journeys into Tibet from points on the north-east in the neighbourhood of Lake Koko Nor: the first was by way of the lakes Charing Nor and Oring Nor, near the sources of the Hoang-Ho river, to Jyekundo, and thence to Ta-Chien-Lu; the second was through Southern Tsaidam and over the Kokoshili and Dangla ranges down south to latitude 32° by longitude 90° 20′.

The country between the parallels of 31° and 32°, and the meridians of 90° to 98°, and thence on to Batang, has been compiled from the surveys of Captain Bower and Mr. Rockhill, with a few additions from the map published by M. Bonvalot and Prince Henri of Orleans.

A considerable portion of the very elevated region of Chang-tang,

which lies between the Kuen-Lun range and the route taken by Captain Bower, is shown as a blank. Russian maps show ranges of hills on this tract which may possibly exist, but are as yet purely conjectural. Thus a blank, with the word "unexplored" printed across it, has been adopted as at present preferable.

As regards the values of the co-ordinates which have been adopted for the construction of this map, to the south and west they have all been derived from the Indian Survey. Elsewhere several latitudes have been determined astronomically by various explorers, which are sufficiently accurate for the purposes of a map on a small scale. The longitudes are less reliable, having, without exception, been deduced from the traverses of the routes.

The longitude of Sachu or Saitu in Mongolia may be taken as an obligatory point. The value adopted for this map is 94° 54′ east of Greenwich, which is the revised value given by Prjevalski in the map accompanying the account of his fourth exploration into Central Asia. Other values are as follows:—

Prjevalski, by his second and third explorations	94° 26′
Krishna, after correction for magnetic variation	94° 23′
Cary and Dalgleish	94° 48′
Littledale	94° 49′
Kreitner, with Count Széchenyi's expedition	94° 58′

The longitude of Darchendo or Ta Chien Lu, on the extreme east, may be taken as another obligatory point. The adopted value is 102° 12′.

Krishna's work gives	102° 15′
Kreitner's	102° 5′
Baber's	102° 18′

THE RECENT TERRITORIAL ARRANGEMENTS IN AFRICA.

By E. G. RAVENSTEIN.

We present the readers of the *Journal* with two sketch-maps designed to illustrate the territorial changes in Africa which have been brought about by the agreements concluded on May 3 at Rome and on May 12 at Brussels. The agreement with King Leopold, as sovereign of the "Independent Congo State," is interesting on account of the novel political "leaseholds" which it creates. It deals with territories covering 209,350 square miles, of which 175,530 square miles are leased to King Leopold, whilst 16,910 are assigned to Great Britain.

In the extreme south the Congo State definitely withdraws its pretensions to 14,000 square miles of territory lying between Lake Bangweolo and the Luapula. The line separating British Central Africa from the Congo State is to be drawn from Cape Akalunga

E.G.R. G. Philip & Son.

MAP TO ILLUSTRATE THE ANGLO-CONGO ARRANGEMENT.

(5° 15′ S.) on the Tanganyika to the debouchure of the Luapula from Lake Mweru.

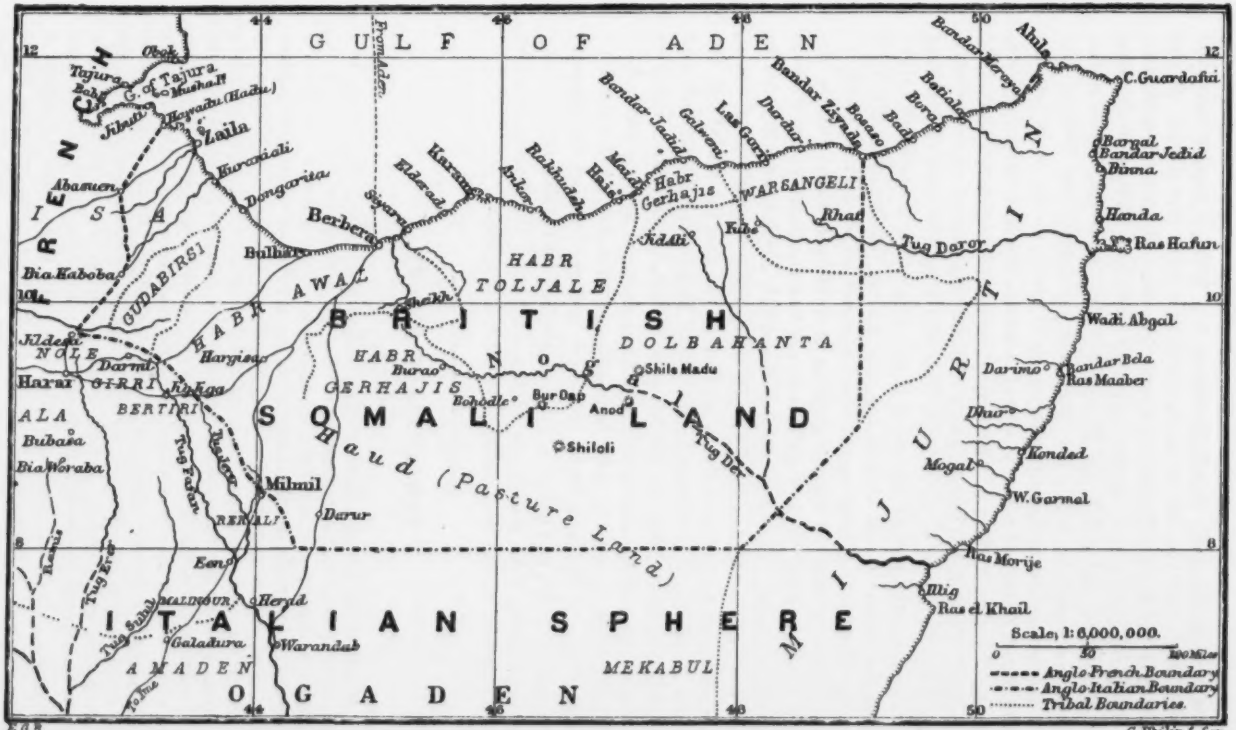
The king has, moreover, granted to Great Britain a lease of a strip of territory 15½ miles broad, 188 miles in length, and consequently 2910 miles in area, which, lying along the north-western boundary of German East Africa, connects Lake Tanganyika with Lake Albert Edward. This lease is to remain in force so long as the territories now constituting the Congo State shall remain under the sovereignty of King Leopold and his successors. This territory is to be administered by Great Britain, who will thus be able to build a railway across it. In addition to this, the Congo State authorizes the construction through its territory by Great Britain, or by any company duly authorized by the British Government, of a line of telegraph connecting British Central Africa with the British sphere of influence on the Nile. It is probable, however, that the arrangement with regard to this strip will be modified.

Far more extensive have been the territorial changes in the Nile region. Art. 1 of the agreement defines the boundary separating the Congo State from the British sphere as following the 30th meridian as far north as the watershed between the Nile and the Congo, and thence following that watershed. This implies the definite surrender to the Congo State and its eventual successor of a territory of 9950 square miles, watered by the head-streams of the Welle-Ubangi and Aruwimi, both of which are tributary to the Congo.

The territory marked **B** upon our map is granted on lease to King Leopold II., who will administer it. This lease will lapse as soon as the king shall cease to be sovereign of the Congo State; but a strip of territory 15 miles in width, connecting Lake Albert at Mahagi with the Congo basin, shall then revert to the Congo State. This territory is bounded on the east by the Nile, on the west by the watershed of the Nile and the 30th meridian, and on the north by the 10th parallel. Its area is 42,790 square miles. Within it lie the well-known places of Wadelai, Dufile, Kirri (where the Nile becomes navigable), Lado, and Fashoda. The existing tribal boundaries have been ignored in this, as in most preceding African agreements.

Finally, the territory marked **A**, and bounded by the 25th and 30th meridians, the watershed of the Nile, and the 10th parallel, has been leased to the Congo State, the lease to remain in force so long as the Congo territories, as an independent state or Belgian colony, shall remain under the sovereignty of King Leopold or his successors.

British Somaliland, as defined in conventions concluded with France (February 1, 1888) and Italy (May 5, 1894), includes an area of 75,200 square miles. This "protectorate" dates from 1884, in which year Great Britain occupied Berbera, Bulhar, and Zaila (Zeyla). In 1885 treaties were made with the Isa, Gadabirsi, and Habr Awal; and by



E.G.R. G. Philip & Son.

MAP TO ILLUSTRATE THE ANGLO-ITALIAN ARRANGEMENT.

an Order in Council, dated December 19, 1889, a protectorate was proclaimed over the whole coast, extending from Ras Jibuti, at the mouth of the Gulf of Tajura, to Bandar Ziyada. In 1887 Great Britain recognized the French protectorate over Obok and Tajura, to the west of Ras Jibuti, and ceded the Musha Islands. According to an agreement concluded in 1888, the boundary separating the British and French protectorates begins at the wells of Hadu, on the coast between Jibuti and Zaila, and runs by way of Abasuen, Bia Kaboba, and Jildesa, in the direction of Harar. That important commercial town, since 1887 occupied by Menelik, the Emperor of Ethiopia, was not to be annexed by either France or Great Britain, both retaining the right of opposing attempts on the part of any other power to acquire or assert any right over the town. Great Britain has now waived this right in favour of Italy, for the boundary agreed upon commences at Jildesa, passes to the north or east of Darmi Jig-jiga and Milmil, then follows the 8th parallel to 48° E., and ultimately reaches the coast in 49° E., near Bandar Ziyada. The territories of the Girri, Bertiri, and Rer Ali in the west, of the Ogaden in the south, and of the Mijurtin in the east, are assigned to Italy, whilst a portion of the Isa, the Gadabirsi, the Habr Awal, the Habr Gerhajis, the Habr Toljale, the Warsangeli, and Dolbahanta live within the British protectorate. Italy claims Harar as a dependency of Abyssinia, over which she assumed a protectorate duly notified to the powers in 1889, in accordance with Art. 34 of the "Act" of Berlin. At the same time, it should be borne in mind the Emperor Menelik in 1891, and again in 1893, denounced that article of the treaty of September, 1889, which placed the conduct of the foreign relations of his empire in the hands of the Italian Government.

THE MONTHLY RECORD.

EUROPE.

Vestiges of Village Communities in England.—Mr. H. T. Crofton, in a paper published in the last number of the *Manchester Geographical Society's Journal*, shows how the irregular boundaries of existing townships and even of counties in England were created by the demands of the pre-Roman village communities. The later manors perpetuated or only slightly altered the boundaries, which gradually acquired permanence. A superficial study of the 6-inch Ordnance Survey map discloses the fact that counties frequently have scattered portions cut off from the main mass, and this is more especially the case with townships and parishes. In a few cases this may be accounted for by the changing course of rivers. Along the course of the formerly widespread Mersey, portions of Lancashire and Cheshire are found on what may be called the wrong side of the river, simply because the river has changed its course. But the usual explanation of such features must be the habits of early peoples in their separate divisions of the family, the tribe, and the nation. The village community existed in Celtic times, before the advent of the Romans. It is known that among the lower classes it was customary for the youngest son to inherit the homestead; among the upper classes all had equal

rights to the strips of arable and pasture lands, which were not broken up. These strips of arable land were divided by unploughed ridges of grass called *bylands*, while across the end of the furrows was a *headland* ploughed at right angles to the rest; these are features which it is well to remember in searching after vestiges of village communities. The measurements varied in different districts; they were purely local standards dependent on the height of the tallest man in the village. By 1340 A.D. a transition took place in the system of holding the strips of land; they now began to be held permanently, and ultimately the strips were enclosed. Mr. Crofton illustrates his arguments from the manor of Withington, 4 miles south of Manchester, where the conflicting claims of the inhabitants have produced a broken and scattered condition of the boundaries. No doubt the townships were for long surrounded by uncultivated portions of land, and as the villages increased in number they were led to take more and more of the borderland into cultivation, the claims of the village communities being possibly adjusted by the lord of the manor. It is very important that local geographers should take up the further study of this subject at once, before parochial boundaries are so far reformed as to destroy the clues which still remain in their complex boundaries. No more useful research into the evolution of political geography in this country could well be found, but the student must set to work cautiously, and will require to have at the outset a good historical knowledge of primitive habits, and, before he formulates his conclusions, a practical acquaintance with the country.

Ethnography of the Aran Islands.—At the last meeting of the British Association attention was directed to the importance of a systematic Ethnographic Survey of the United Kingdom. Professor N. C. Haddon and Dr. C. R. Browne of Dublin have recently prepared for the Royal Irish Academy (*Proceedings*, 3rd series, vol. ii. No. 5) an exhaustive study of the Aran Islands, which is intended as the first of a series of studies in Irish ethnography. These islands, which lie in the mouth of Galway Bay, about 28 miles west of Galway harbour, are three barren masses of limestone rock, thickly strewn with large ice-worn erratic boulders of granite and sandstone from Connemara. The total population is nearly 3000. The inhabitants of an island do not marry outside it; consequently little fresh blood is introduced, and there is considerable facial resemblance among the natives. They are well made, of good stature, with grey or blue eyes, and usually dark brown hair. The general facial type has been described as an exaggeration of the Gaelic. The authors made a large number of anthropometric measurements, which are given, together with typical photographs. The data thus collected lead them to dissent from the opinion that the Aranites are descendants of the Firbolgs, a small, swarthy, dark-haired people, held to be of Thracian origin. The chief antiquities of the islands are the well-known pre-Christian duns or forts. Cloghans, or beehive stone huts, are common. Primitive customs and beliefs abound. Offerings are regularly made at sacred wells and other holy places. The skin of the seal is used as a preventive against gout and colic. The belief in the evil eye is almost universal. Stone anchors are still in use, and querns have been employed until quite recently. An excellent bibliography completes a valuable paper.

Ethnography of South-East Hungary.—The 'Abrégé du Bulletin de la Société hongroise de Géographie' (xxii. année, 10 numero, Budapest) consists of a monograph on the Hungarian population of Torda, Aranyosszék, and Toroczkó, abridged from the larger work of Dr. Johann Janko. It is very similar in scope to Professor Haddon's paper on the Ethnography of the Aran Islands, but there is less attempt to co-ordinate the abundant data collected. The region in question forms part of the province of Siebenbürgen, and is roughly bounded by the

Bihargebirge on the west, on the south by a line drawn from this range to Nagy-Enyed, on the south-east by the Maros, and north by its tributary the Aranyos. The Wallachian elements in the population are not considered. Full anthropological and anthropometrical details are given, and a minute comparative account of the prevalence of surnames, distribution of trades, and of the food, clothing, and structure of houses, etc. The most interesting portion of the paper, dealing with betrothal, marriage, baptismal and funeral customs, is too long and detailed to be summarized here.

Subterranean Explorations in the Dalmatian Alps.—In the *Comptes Rendus* of the Paris Geographical Society (1893, p. 432), M. Martel reports on his mission for the scientific exploration of the grottoes and underground water of the *Karst* regions west of the Adriatic. Assisted by the engineer, W. Putick, he was able to add much to the knowledge of the grottoes near Adelsberg (Carniola), and to prove that one branch of the Unz (the stream which waters the valley of Planina) is derived from the intermittent lake of Zirknitz. The other branch was traced for a long distance within the grotto of Adelsberg, which proves to be the longest in Europe. In Bosnia and Herzegovina the abundance of the water and the unwillingness of the inhabitants to penetrate far underground, stood in the way of thorough exploration, but enough was done to show (1) that, as in other limestone regions, to which these are exactly parallel, the springs are due to the rain absorbed or streams engulfed in the higher lands; (2) that the "natural wells" may quite well have been formed by the superficial erosion of a body of water; (3) that the temperature of the springs is often much below the mean of the place in which they occur, the water having been absorbed perhaps some thousands of feet higher. Much still remains to be done in the way of systematic exploration, the practical results of which will be important in the direction of better management of the water-supply, etc. In the same periodical (1894, p. 5) the recent exploration of the extensive, many-chambered grotto of Tharaux, in France, is described, with plan and sections. Here some bones of ruminants and a human thigh-bone of large size were discovered.

The Northern French Jura.—The April number of the *Annales de Geographie* contains a long paper on the Jura of northern Franche Comté by M. W. Kilian, professor of geology at Grenoble. The map which illustrates the article is accompanied by a superposed transparent sheet, showing all the synclinal and anticlinal foldings of the strata, and the numerous faults that occur. M. Kilian classifies the district in and around the department of Doubs into five natural regions. 1. The low-lying ground, which rises to from 900 to 1200 feet, between the Rhine and the Saône. The soil is alluvial, forming fertile field and bearing forests, but when it is very sandy it is less capable of cultivation. The population is mainly agricultural. 2. The hills bordering the Vosges with silicious soil, bearing its typical vegetation of broom, heather, purple foxglove, etc., in marked contrast to the rest of the district. Some famous millstones are quarried here, but most of the people find their livelihood in the forests. 3. The plateaux and hills of Haute Saône, with fertile marl lands to the north (meadows, fields, vines, etc.), limy plateaux partly wooded, partly cropped with cereals and potatoes, and the rest on the whole infertile. 4. The western edge of the Jura—the pre-jurassic hills and sub-Vosgian steeps, as Professor Kilian calls it—a series of undulating plateaux, averaging 1200 to 1600 feet high, between the Jura and the Ognon, where they end in abrupt cliffs. On the plain up to 1200 feet cereals predominate, but the vine also grows, and rich meadows cover the silicious soil. This soil on the higher ground, which rises to 2100 feet, is also fertile, and is in great contrast to the limestone parts, which are barren. Breeding is common everywhere, and the industries

carried on in the valleys make Franche Comté one of the richest regions of France. 5. The Jura Mountains of the Department of Doubs. The middle mounts, a plateau averaging from 2000 to 2300 feet, with summits rising to 3000 feet, and the higher or true Jura mountains consisting of plateau from 3000 to 3300 feet, with peaks almost 4500 feet. The middle mounts are cultivated in the lower parts, and consist of forest and pasture lands in the upper parts; the mountains show a vivid contrast of sparkling green pasturage and sombre pine forests; the houses with overhanging roofs, and the melancholy cadence of the cow-bells, all help to constitute the charm of the French Juras. The people in the lower valleys are industrial, working forges, sawmills, distilleries, etc.; and clockmaking is a common industry on the plateaux. Agriculture and horse and cattle breeding are common on the lower grounds, but the upper valleys and plateaux are used for pasturage, the district being famous for the production of gruyère cheese. Crops are rare over 2500 feet; but absinthe is cultivated in the high valley of the Doubs, near Portarlier.

Geological Excursion in the Alps.—In connection with the Sixth International Geological Congress to be held at Zurich next autumn, a long excursion has been planned, under the guidance of Professors Brückner, Du Pasquier, and Penck, for the special study of the remains of the Great Ice Age. The excursion will start on September 17 at Lugano. On the first day the moraines of the Ice-Age glacier of Lago Maggiore will be studied, on the second the party will move on to Ivrea, on the third day to the Garda lake, on the fourth the Bremen Pass will be crossed, the Sillthal examined, and the fifth and last day will be occupied by an excursion to study the moraine features of the neighbourhood of Munich. A special guide-book for the tour is in preparation, and will soon be published. Those wishing to take part in the trip are requested to send their names to Professor Brückner in Bern.

The Rivers of Russia.—A large expedition is to be sent out this summer for the exploration of the rivers of European Russia. The first impulse having been given by the necessity of studying the causes which result in a continual increase of the shallowness of Russian rivers, the expedition has been planned, under the leadership of General Tillo and several geologists, in quite a scientific way. The sources of the rivers will be investigated first, and especially the plateau from which the Volga, the Düna, the Oka, the Don, and many of their tributaries take origin. Typical rivers and typical regions have been carefully chosen for this year's exploration. The Volga is taken as the type of a river originating in a plateau covered by marshes and lakes; the Krasivaya Mecha ("Pretty Mecha"), a tributary of the Don, is taken as a type of rivers originating also on a plateau, but from springs, and so on. The exploration will be geographical, geological, and economical—its leaders being General Tillo, M. Nikitin, professor of geology, a professor of forestry, M. Turskiy, an engineer, and an agriculturist.

ASIA.

Rewards to Tibetan Explorers.—The Indian Government have granted Rs. 1000, together with the title of Rai Bahadur and a medal, as a reward to the Lama Ugyen Gyatsho, the well-known Tibetan explorer, for his geographical exploits spread over a series of years. His first journey was made in 1879, at a time when he was serving under the director of public instruction for Bengal, by whom he was lent to the Survey Department for the expedition referred to. It was carried out in company with Sarat Chandra Das, and extended from Darjiling to Shigatze and back; but the full account, for some reason, was never published. A brief abstract will be found at p. 45 of the Survey Report for 1881–82, in which

the Lama's name is not given, but only that of the Babu Sarat Chandra Das, though the former was the better linguist, and personally known in Tibet, while his companion was not. In 1881–82 the Lama explored a part of Western Tibet, including Jang Lhachi, Sakya Jang, and Lake Chomo Telthung, a journey to which reference is made at p. xlvii. in the appendix to the Annual Report for 1883–84. His most important exploration was in 1883–84, when his travels practically covered the whole of the north-east trans-frontier sheet No. 6 with a network of traverses, and also parts of the three sheets immediately to the west, south, and east. His data on this occasion supplied much original information about the true configuration of the famous Yamdok Tso or Palti lake, the Lhobrak river and its main affluents, which form the Manas river of Assam, and the Tigu Tso lake. The traverses also tied together a good deal of scattered data, acquired by Captain Pemberton in 1840 and by subsequent explorers. As to the accuracy of the Lama's work, Colonel Tanner reported of it in 1887 that it was of first-rate order. The traverses were computed and plotted on rectangular co-ordinates, after the manner of chain and theodolite traverse. Starting from the Chola Pass and closing on Chetang, the longitude of Lhasa agreed with Nain Singh's by less than a mile. The Lama made none of those long halts which have so often delayed the work of other explorers. He was thoroughly interested in the operations in which he was engaged, and in general the colonel considered that his work bore comparison with that of the best explorations in Tibet. Subsequently Lama Ugyen Gyatsho rendered some material help in the preparation of the manuscript narrative of a journey from Darjiling to Gyala Sindong, Tsari, and along the lower Sanpo, by another Tibetan, Kinthup, who had been sold into slavery, and kept a prisoner for nearly six years while conducting that exploration, and who has since received a gratuity of Rs. 3000 from Government. The Lama also assisted in drawing up an account of the Pama Koichen country, from the original manuscript of a Mongolian lama named Sarap Gyatsho. More recently Ugyen Gyatsho rendered invaluable service as chief interpreter, during the latter part of the Sikkim expedition, in obtaining information from prisoners, or in supplying useful details regarding the road from Jelep to Chumbi. As a result of his researches and inquiries, a revised map of Eastern Tibet was drawn up, which compares favourably with the route-map of M. Bonvalot.

The Pamirs.—The Russian *Official Messenger* publishes a letter from Sven Hedin, who has made, during his journey from New Marghilan to the Russian military post, Pamirski, very interesting scientific observations. He reached the post on March 18, after a very difficult journey, the most difficult part of it having been the passage through the Tenghiz-bai gorge. The northern slope of the pass was all covered with snow avalanches, which were forming large snow cones, round each of which a special footpath had to be made for the passage of the beasts of burden. Once, when this precaution had been neglected, a horse slid on the icy surface of a snow corniche, and fell down a precipice, 120 feet deep, into the river Isfairam, and of course was killed on the spot. Still the passage through the valley of the Isfairam was delightful, on account of the beauty of the views, which opened at every step of advance. From Austan to Langar the ascent is very steep, and the mass of snow increased, so that after a twelve hours' ascent the party was half broken down on reaching the Kirghiz yurts at Langar. On the southern side of the Tenghiz-bai Pass the snow was also very deep. On the day before, an enormous avalanche, over 400 yards long and over 20 yards deep, had fallen, and when the party reached Daraut-kurgan a snowstorm began. Snow was also very deep in the whole of the Alai valley. It appeared from a measurement that the Kizil-su at Daraut-kurgan carries 26·3 cubic yards of water per second (2,272,500 per day); but during the

summer the same river carries four to five times more water than during the winter. At Bardob the traveller dug through the snow, and found it 1 yard (91 centimetres) deep; it consisted of six different layers, indicating six different periods of snow-fall. The temperature of the air being 11·3° Fahr., the temperature of the snow at a depth of an inch was—8·5° Fahr., and it increased by 1·8° Fahr. for each 15¾ inches (one-tenth of a centigrade degree for each four centimetres). It may thus be taken that, on the Pamirs and the Alai, the soil freezes to a depth of 3·3 feet, where it is protected by the snow from the burning rays of the sun. Snow remained deep as far as Kizil-art, but on the southern side of this gorge it became scarce, and large spaces remained quite free. Taking advantage of the ice which covered Lake Kara-Kul, M. Hedin made measurements of its depth. As might have been expected from the surrounding mountains, which appear in high and huge masses on the western shore, while the eastern shore lies in flat valleys, the depth of the lake in its eastern part is small; but it is more considerable than might have been expected from a lake lying on a plateau, in its western part: there it attained 825 feet. The temperature on the surface was that of the freezing-point. but it increased where the depth was greatest. The thickness of the ice was such, the author remarks, that St. Petersburg might have been built on the western side of the lake, and Moscow on the eastern side. On Muz-Kol M. Hedin saw a very interesting formation of ice, deposited by two wells, which had assumed the form of two small volcanoes, 16 and 26 feet high, and about 660 feet in circumference, with a funnel in the middle, from which water was continuing to flow. The Ak-baital Pass was very difficult, and the party there lost a second horse. Altogether, the winter journey on the Pamirs is full of hardships, and it could not have been performed were it not for the extreme kindness of the Kirghiz and the Russian authorities. Favourable circumstances must also be taken into account. There was only one snowstorm, and the temperature was not unbearable. The observed minimum was—36·5° Fahr. on Kok-sai, and at Urtak it was —30° in the open air, and —12° in the tent. At Kara-Kul the party was met by a "jighit," despatched from the Pamirski post; and on March 18 they saw the most wonderful sight of a Russian post, with its earthen fortifications and quick-firing guns, amidst the wild plateau of the "Roof of the World." The fort, the traveller remarks, is very well built, and the difficulties which must have been overcome testify to the enterprise and energy of the builders.

The Amur Geographical Society.—A new branch of the Russian Geographical Society has been opened at Khaborovsk, the capital of the Amur region. The "Society for the Study of the Amur Region," which has been in existence for several years, and has issued a number of valuable publications, will form the nucleus of the new branch of the Russian Geographical Society, which will be named "the Amur Branch." Like the East-Siberian Branch, it will receive from the Government a yearly subsidy of 2000 roubles. It is already in possession of a good library, to which books have been contributed by members of the Imperial family, the President of the Siberian Railway Committee, and other high functionaries.

Cartography of Russian Turkistan.—During the year 1893, several important cartographical undertakings have been accomplished in Russian Turkistan. Surveys on the scale of 550 yards to the inch have been made in the provinces of Syr-daria and Fergana, in the neighbourhood of the Pamir military station, at Kala-i-khumb, and of the passages across the Amu. Surveys on the scale of 2 versts to the inch have been carried on on the Pamirs and along the Amu, so that a complete map of the whole of the navigable part of the Amu, as also of part of its upper course, is now ready. Surveys on a smaller scale (5 versts to the inch) have

been made chiefly in Bokhara, where a detailed large scale plan of the capital has also been prepared. The cartographical department of the general staff has prepared the following maps: the roads of the Turkistan military district, on a scale of 40 versts (27 miles) to the inch; the Alai road (10 versts to the inch); the Russian settlements in Syr-daria; Southern Turkistan, with an indication of the lands which can be irrigated; and the fifth sheet of the seventh series of the great map of Russian Turkistan (10 versts to the inch). Reconnoitring surveys have been made in the mountains of Roshan; in Darvaz; of the roads from Tash-kurgan to Sarez; from Markan-su to Kashgar; from Kashgar, *viâ* Sari-kol, to Rang-kul; and from Guzar to Kerki; as well as in the delta of the Amu-daria.

Russian Tibet Expedition.—The following telegram has been received at St. Petersburg from the chief of the Tibet expedition, Captain Roborovsky. It was sent from the Sa-chu oasis, on March 14, through Kulja. "From Lukchun the expedition has passed by the southern desert road to Sa-chu. Kozloff has come here as well, through Kizil-sinir, so that our march-routes have girdled the desert. Three excursions have been made into the interior. The surveys made from Lukchun cover 2540 versts (over 1600 miles); nine astronomically determined points. Killed for our collections six wild camels. The other work of the expedition is also done regularly. Propose to make two more excursions into the mountains before leaving Sa-chu. Spring has come, grain is sown. The expedition all well and in good spirits. Friendly with the Chinese. Not met with engineer Obrucheff. More details by letter."

Plants from Tibet.—Mr. Hemsley has lately reported on the plants collected by Dr. Thorold during Captain Bower's recent expedition to Tibet, of which an account has appeared in the *Journal*. Not a tree nor a shrub was seen by the party during the five months they spent at an altitude of over 15,000 feet. 115 species of plants were brought home, one-quarter of them being peculiar to Tibet. The highest elevation at which a flowering plant (*Saussurea tridactyla*) was found was 19,000 feet; but the Schlaginweits discovered a plant living at a still greater elevation (20,000 feet), at a higher latitude. Red-coloured flowers formed a quarter of the whole, then yellow, white, and blue. Many of the plants were well protected by thick wool. Butterflies were seen as high as 17,000 feet.

Orthography of Shan Names.—We have received, though somewhat late in the day, a copy of the "Tables for the Transliteration of Shan Names into English," published by the Superintendent of Government Printing, Rangoon, 1892; price 2 annas. These tables give the English equivalents for sounds according to the Shan and Burmese dialects, and are accompanied by explanatory notes and a list of the principal Shan place-names in the vernacular, with the transliteration as directed by the new rules, and also giving the form of spelling hitherto in use and now considered obsolete. Though it is undoubtedly an advance to have any authorized rules issued on the subject, especially in connection with a language so difficult and little known as the Shan language, still it is to be regretted that, when introducing the system, it was not found possible to adopt, or at all events to more fully adapt, the rules for the orthography of native names, published by the R.G.S. and now so largely in use. The rules we are now reviewing express many sounds by means of diacritical signs, which we cannot help thinking might have been dispensed with for all practical purposes, especially if one acute accent were admitted, as in the R.G.S. rules, to show on what syllable the inflection should be put. In making a map of the Shan states these rules would be useful, but it would be necessary to retransliterate them into the rendering according to the R.G.S. rules in order to do away with the diacritical signs, which must be obnoxious to the mapmaker and to the general reader. We, however, congratulate those who have

thus made a beginning, and an effort to secure some sort of system and uniformity, and only hope that eventually their system may be still further simplified.

AFRICA.

French Expeditions in the Sahara.—The two expeditions which have lately attempted to open a route from South Algeria to the Sudan, through the territory of the "Asjer" Tuareg and Air, have returned without accomplishing their main object, though they may be said to have paved the way for future success (*Revue Française*, May, 1894). M. Foureau, the leader of the first (*vide* vol. iii. p. 332), has already described his journey before the Paris Geographical Society. After his rapid excursion towards Insala, he took the road to the south-east, and crossing the Igharghar river-bed, reached the Asjer country by a route differing from that of Colonel Flatters in 1880, though in part coinciding with that of Duveyrier (1860). After long negotiations, he obtained permission to proceed southwards, and had reached the mountainous region of the *Tassili*, which forms part of the long line of high ground stretching from Tuat to Tibesti, when the opposition of a fanatical *sherif* compelled his return, this being the third year which he has spent in unsuccessful efforts for the opening of this route. Following in his steps only a few weeks later, the second expedition, led by M. d'Attanoux, was not likely to fare better. He succeeded, however, in allaying the suspicions of the Asjer, and obtained their recognition of the treaty of Ghadames of 1862, besides an assurance that they would use their influence with the Kel Wi further south for the opening of the route next year. Both travellers found considerable quantities of water in the *wadis*, and the temporary lake of Menghough, which formed the turning-point of the latter, was full at the time. The *Tassili* above mentioned consists of dark limestone, bristling with sharp peaks and fissured by *wadis* running north and south, which afford natural routes to the Sudan. M. d'Attanoux arrived at Biskra, *viâ* Tuggurt, on April 7, and was shortly to give an account of his journey in Paris.

Meteorology of German West Africa.—Systematic meteorological observations have for several years been carried out at some of the German stations in West Africa, and the results for recent years are published in the *Mitt. aus d. Deutschen Schutzgebieten* (1894, part i.). In the case of Bismarckburg, in the interior of the Togoland Protectorate, they extend from June, 1891, to May, 1893; but, according to an editorial note, have not been made with such care as in the preceding years, so that less interest attaches to the averages for the five for which observations are now available. It is especially to be regretted that the comparison of the temperatures given by Assmann's Aspiration Thermometer with those obtained in the ordinary way was not more complete, so that it might be seen how far the results usually obtained in a dry climate with few clouds are in excess of the truth. The observations, however, suffice to show that the difference is most pronounced during the dry months, which agrees with the fact that none is observed in a moist and cloudy district like the Cameroons. Judged by the mean of observations taken at 6 a.m., 2 p.m., and 9 p.m., the hottest months are February and March (in which the barometric pressure also is lowest), and the coldest July and August. The extreme range of temperature during five years was between 52·7° and 99·7° or 47° F. The principal rainfall is between April and October, with, however, a more or less marked break in August. Even in the dryest months there are from three to five days with rain, the minimum for a month being about one-tenth of the maximum. Between October and February east or north-east winds are the most frequent, and for the rest of the year those from the west, south-west, or south. A constant direction is not maintained for any length of

time, for, except in the case of westerly winds in July, in no month did even a third of the observations show the same direction. At the Cameroons station the rainfall is, of course, much greater, as much as 40·2 inches falling in one month (July) in 1891 (an abnormal year, however). Here, too, a slight falling off in August is noticeable, as also in the third station to be referred to, but the dry months are fewer. While the average temperature of the hottest month is about the same as at Bismarckburg, the yearly range is less, the coldest month being higher. From the greater completeness of the observations at Baliburg (northern interior of the Cameroons) in 1892 than in 1891, the yearly variations are brought out better, and especially the fact that there is a principal maximum and minimum of temperature in April and July respectively, and subordinate ones in November and January. With lower actual temperatures, the extreme range was almost exactly the same as at Bismarckburg (47·3° F.). The amount of rainfall was intermediate between those at the other stations. In distribution through the year it agreed more with that at the Cameroons, there being only two months (December and January) with rain on fewer than 11 days. The preponderance of west and south-west winds is very marked, more than half the observations (excluding those during calm) showing one or other direction. This no doubt explains the greater accord in the observations with the Cameroons than with Bismarckburg, though in distance from the coast the station corresponds more with the latter.

Italian Explorations in the Basin of the Jub.—From an account of these explorations by G. E. Fritzsche, in *Pet. Mitt.*, 1894, No. 5, we learn that Prince Ruspoli, after replenishing his supplies at Bardera (*vide* vol. iii. p. 137), carried out his intended journey towards Lake Rudolf. From the Upper Dau, he is said to have crossed the watershed to the south of Lake Abba, and to have reached the Omo, on the right bank of which he proceeded as far as Gubaljenda, in the Gobo district. Here he was unfortunately killed by an elephant while hunting, but his collections and journals were brought back to the coast by his followers. It is not stated whether the question of the final destination of the Omo was cleared up. As, however, the district of Gobo, as given on our present maps, is considerably south of Borelli's furthest point, and only 70 miles from Lake Rudolf, there is hardly room for doubt that that river does empty itself into that lake. A map is given with the article above mentioned, in which the route of the Italian travellers, as laid down provisionally by the Italian Geographical Society, are adjusted to positions fixed by other travellers. Bóttego's furthest point among the head-waters of the Jub is carried on the Italian map as far north as 7° 22½′ N. L., his Mount Fakeo being identified with the Mount Unkolo-Mutte seen by Traversi in 1887, and the Jub basin extended north of 8° by the inclusion of the Webi Sidama and other streams usually supposed to flow to the Webi Shebeyli.

AMERICA.

The Upper Ohio Basin in Pre-Glacial Times.—Messrs. Chamberlin and Leverett publish a long account of their recent studies in the drainage features of the Upper Ohio Basin, in the *American Journal of Science* for April (vol. 47, p. 247). The article is illustrated by several maps, showing the present drainage system, the moraine borders, older drift borders, and old outlets to Lake Erie, which form the base of a map of the probable drainage features in pre-glacial times. The authors conclude that then the Upper Allegheny turned northward from its present course at Steamburg, and reached Lake Erie by the Conewango Creek reversed and the Cattarangus valley; and it was probably joined by the Upper Conewango-Tionesta system. Another system was that of the Old Middle Allegheny, which

included the lower portion of the Tivesta, the Allegheny from Thompson's to Franklin, whence it flowed along French Creek and Sugar Creek, turning south-west and reaching French Creek again north of Utica, and thence to Lake Erie, East Sandy Creek flowed as it does now, and then followed the present Allegheny bed reversed to Franklin. The other left affluent of this Old Middle Allegheny River flowed from near the mouth of the Clarion River north-westwards along the present Allegheny valley, and along West Sandy Creek still in a north-west direction to Waterloo, where it turned northwards and joined the main river, where Sugar Creek *now* meets French Creek. The Lower Allegheny Monongahela and Upper Ohio are made into the basin drained into Lake Erie, as suggested by Dr. J. W. Spencer and Dr. P. Max Foshay, from whom the present authors differ only in making the probable watershed 50 miles further south on the Ohio. The Clarion, the Allegheny from Parker, the Monongahela, and all the affluents of these met at Pittsburg as at present, followed the Ohio bed to Beaver, received there a tributary, following the present Ohio course from beyond North Martinsville, and then flowed northwards along the Beaver valley to Sharon, bent south-west until the Mahoning valley was met, and flowed north-west along it until in a line with the Grand River, by which it passed to Lake Erie. They also publish a number of sections showing rock-floor, moraines, drift, glacial gravel, the old river-beds and the beds of the present streams. They assert that the phenomena described and mapped can be explained only by some hypothesis considering simple glacial and fluvial action, allowing for discontinuities—stages of deposition separated by stages of excavation. They give four such hypotheses, all of which agree in emphasizing the deposition that took place in the first glacial epoch, followed by a period of excavation, when gravel or gravel and rock were removed.

Types of Craters in Mexico and Guatemala.—Dr. Carl Sapper summarizes the observations he made on craters during his travels in Mexico and Guatemala in 1892 and 1893, in the April number of *Petermanns Mitteilungen*. The rapidity with which a newly formed crater is transformed, and the shape it ultimately takes, depend on the nature of the materials of which it is composed, and on the strength of the various weathering agents, wind, rain, frost, chemical decomposition, etc. When the cone is originally made up of ashes, it is very soon modified by the falling away of the loose material, so that the mouth of the crater is widened, and a rapid flattening and lowering of the summit takes place, the winds and eroding agencies having full play. Such craters are Monterico, or in the limiting case Tacana, where nothing is left but the rocky foundation of the mountain. Lapilli craters have much the same history, but spread over a longer period; for instance, the south great Atillan volcano. In mixed craters the walls are partly of stone and partly of looser material. These are very common. The rocky part still shows the original outlines of the crater with steep walls, the looser part is modified as in the case of the ash craters, but less rapidly, as the stone walls form a protection. This is well seen in the principal crater of Tajumulco, and was probably the condition in most craters now partially destroyed. The most stable form is the true rocky crater, whose walls change very little. In the upper part is a ring of débris of loose eruptive material, while another rubbish band is formed round the bottom of the crater wall, making the originally tubular crater kettle-shaped. Popocatapetl is an example, but not a perfect one, as some lapilli banks occur in it.

AUSTRALASIA.

The Horn Expedition to Central Australia.—The following information regarding the above expedition is taken from recent numbers of *The Colonies and India*. The arrangements for the fitting out and equipment of the scientific

expedition which Mr. W. A. Horn, of Adelaide, has sent at his own expense to the MacDonnell Ranges, were completed with great care. Having obtained leave from their duties at the University of Adelaide, Professor Ralph Tate and Dr. E. C. Stirling took charge, the former of the palæontological and botanical researches of the expedition, and the latter of the ethnological department, acting also as medical officer. Professor W. B. Spencer, of the University of Melbourne, conducts the studies in biology. The names of the other gentlemen in the expedition, with their respective posts, are: Mr. Charles Winnecke, surveyor and explorer; Mr. Watt, of the Sydney Geological Survey Department, field geologist; and Mr. F. W. Bett, of Adelaide, and Mr. G. A. Keartland, of the *Age* staff, Melbourne, ornithologists and general collectors. There are also several camel-drivers. Mr. Horn has left with the expedition, and will have charge of the party while he is with them, and, with Professor Spencer, he will undertake the work of photographing. The expedition proceeded by rail to Oodnadatta, and thence started to follow the Finke river to its junction with the Palmer. The route will then most likely be to Petermann Creek, where fossils have already been found, and thence to Gill's Range, Glen Edith, and Glen Helen, to Hermansburg, the Lutheran Mission station at the head of the Finke. Thence to the Glen of Palms and on to the Alice, and then return to the railway terminus. It is expected that the expedition will spend about three months in the far interior.

Neu Mecklenburg.—Neu Mecklenburg, which used to be called New Ireland, is an island of the Bismarck Archipelago, now under German rule. There is only one harbour in the very south of the south-east volcanic part of the island, of which little is known. Count Pfeil communicates a full account of his visit to the low, narrow, central portion of the island, which is composed of sedimentary rocks, to *Petermanns Mitteilungen* for April, 1894. He managed to land on the south-west coast, and clambered up the steep limestone, cutting down the underwood to clear a path to the top of the ridge. Few streamlets and only one or two villages were passed on the way. At the summit the sea could be seen on both sides. The villages on the eastern side were very neat, but the people were shy. A stretch of bush-covered flat land, through which a considerable stream flowed, was crossed before reaching the shore, which is fringed by a reef a mile broad. The party followed the shore northwards, and stayed for some time in a village whose inhabitants were friendly, and then turned southwards, crossing back to the south-west coast by a more southerly route than that by which they had come. An attempt was made to explore the southern part of the island, but after crossing the ridge the natives picked a quarrel with the count's men, and he was forced to turn back, with two of his party killed. The upper slopes of the hills are usually enveloped in mist; the intensely green vegetation consists of a profusion of mosses and ferns, with some fine orchids. The whole island is well wooded. The natives cultivate the taro and yam, the women doing most of the work. The sago palm is another source of food. There are no cockatoos, parrots, nor cassowaries, but the yellowish Torres Straits pigeons with black-bordered wings are very plentiful. There are many beetles, but few butterflies. Thin, big-boned, long-tailed black pigs are the only domestic animals, and they are well looked after when young. The giant mussel Tridacna found on the coast is too powerful to be opened by force, so when the natives see a shell gaping they thrust in a stone or a large stick, to prevent its shutting—the stick usually being well "bitten." The original inhabitants have been driven to the north and south of the islands by invaders who settled in the centre. These people build neat houses and are very cleanly, but they have a marked odour. The men are usually naked. Their weapons are spears, of which they have two sorts—one of hardwood, the other with a hardwood point fixed into a

bamboo handle—and axes, without which they never travel. They have no shields, but use two sorts of drums. The ornaments are primitive. A piece of bamboo stem, whose diameter gradually increased, is thrust through the cartilage of the nose; armlets are made by a ring being carefully knocked off Triton mussel shells, and polished Tridacna shells are also used. Some excellent wood-carving is found, especially on the posts of the "tambu" house, on dance masks, and on the commemorative sticks, whose significance is not quite understood, though it is supposed to be historical. The natives are cannibals; the women cook the human flesh, but are not allowed to partake of it beyond licking their fingers. The natives are great traders, sailing in their canoes, which are made of a hollowed tree with an outrigger, in the west, but of separate planks fixed together and calked, and without any outrigger, on the south and east. Their money consists of different-coloured mussel shells, red, black, and white; each kind is strung separately, and each has a definite value. A special sort made of white discs fastened end to end to two strings, and sometimes increased in value by having bristles on the discs, is used in pig-bartering. The marriage customs are unknown for the south, they are almost none in the north, and resemble those of the adjoining island in the centre. The dead are burned, or buried at sea, with a stone fastened to the feet, and a bush in the hand to keep the body upright, and to frighten away the fish they hope to catch from the corpse. They believe in a continuation of life, the souls of the dead going to a near island, and in an invisible god and his wife, the mother of all men, who communicate with them through the priests, and profoundly influence their lives.

POLAR REGIONS.

The Danish Polar Observations at Godthaab.—The first part of vol. i. of the observations made at Godthaab during the twelve months August, 1882, to August, 1883, has recently been published by the Danish Meteorological Institute, and forms an important addition to the international series of polar observations. Three papers are included in the part issued, and of these the two first deal strictly with observations actually made at Godthaab; they are concerned with the appearances of the aurora borealis and with the measurement of terrestrial magnetic forces. The observations of the aurora are discussed by M. Adam Paulsen, under whose direction they were made; and the results, while differing in some respects from those deduced by Carlheim-Gyllenskiöld from the observations made simultaneously at Spitzbergen, seem to agree in modifying some of the conclusions founded by Tromholt on Kleinschmidt's observations at Godthaab during the period 1865–80. M. Paulsen gives a specially emphatic denial to Tromholt's hypothesis that periodic changes take place in the position of the auroral zone. He agrees with Carlheim-Gyllenskiöld in rejecting Weyprecht's classification of auroral forms, referring all appearances observed to two distinct types, the zone or horizontal luminous sheet, and the various forms of arch or band, the latter including the so-called "draperies." The mean azimuth of the summits of the arches was S. 42° E. compared with S. 24° E. at Spitzbergen, and the "auroral anomaly" or angle between the azimuth and the magnetic meridian was 15° 30′, against 11° 27′ at Spitzbergen. It is to be regretted that M. Paulsen's observations do not give more explicit information as to the position of the boreal crown; further evidence of its coincidence with the magnetic zenith would have been extremely valuable. Numerous measurements of the height of the aurora were made by a method described by M. Paulsen in a paper read before the Royal Danish Academy in February, 1889, with results varying from 500 feet to 42 miles. The aurora was several times observed at elevations lower than the summits of neighbouring mountains or than the lower clouds—contrary to the experience of the Spitzbergen observers, who

record only two or three cases of elevations less than those of the upper clouds. The diurnal maximum occurred at 9 p.m., agreeing with Spitzbergen; and the annual variation, absent at the latter station, gave a maximum at the winter solstice.

The Surface Temperature of the North Atlantic.—An appendix to the volume of 'Danish Polar Observations,' recently published, contains a series of charts showing the mean temperature of the surface of the sea along the main routes between Scotland, Iceland, and Greenland. The observations, derived from log-books of Danish ships, number nearly 95,000, and cover the period 1876–90. Separate charts are given for the six months April to September, and the isothermal lines are drawn from the temperatures computed for 1° squares. One of the most striking features of these charts is the manner in which they show the seasonal changes in the axis of minimum surface temperature running northwards from Scotland past the Faroe Islands. This inflection of the isothermals is well defined in the charts of mean surface temperature published by the Norwegian North-Atlantic Expedition, and the Danish charts agree in showing that it is most strongly marked during spring, almost disappearing in autumn; facts which seem to indicate that during the former season the south-easterly winds associated with the "Iceland depression" tend to deflect part of the drift current from the Gulf Stream in a north-westerly direction, dividing it into two main sections, and leaving an intermediate space to be occupied by colder water. The limits of the east Greenland current are defined with great sharpness, and it would appear that this stream sends a branch round the north-east and east coasts of Iceland, divided from the main body by the warm drift round the western extremity. In every case the minimum surface temperature off the coast of Iceland is found to the east and north-east; and the fact that during July and August the sea is on an average more than 1° Fahr. colder than the air accounts for the high relative frequency of fogs in those regions. The occurrence of this cold area can scarcely be explained by any assumption of up-welling water, and presents another example of the complex "interdigitation" arising when two surface currents meet each other end on.

GENERAL.

The late Dr. Rae.—A biography of the late Dr. John Rae, F.R.S., the Arctic traveller, being in course of preparation, we are requested to say that Mrs. Rae will be obliged by the loan of any correspondence or other documents likely to help her. Her address is—Mrs. John Rae, 10, Royal Terrace, Warrior Square, St. Leonard's-on-Sea.

MEETINGS OF THE ROYAL GEOGRAPHICAL SOCIETY, SESSION 1893–94.

Special General Meeting, May 21, 1894.—CLEMENTS R. MARKHAM, ESQ., C.B., F.R.S., President, in the Chair.

THE Meeting was summoned by the Council by the following notice, which was sent to all Fellows in Great Britain:—

The Council give notice that a Special General Meeting will be held at 3 P.M., on Monday, May 21st next, in the Hall of the University of London, Burlington Gardens, W. (by permission of the Senate), Clements R. Markham, Esq., C.B., F.R.S., etc., President, in the Chair, to consider the following proposals by the Council as to the alterations in the Society's Rules dealing with Special General Meetings.

Regulations, Chapter V., Section 1, par. 3, to read as follows, the words in *italics* being the proposed addition:—

"This Meeting shall have for its objects to elect the Council and Officers for the ensuing year; to receive the Annual Report of the Council; to hear the President's Address, and to present the Gold Medals and other Awards of the Society, *and no other business shall be transacted.*"

Chapter V., Section 2, par. 2, to read as follows, the words in *italics* indicating the proposed changes or additions:—

"Any six Fellows may propose * to the Council, by letter addressed to the Secretaries, any new regulation, or the alteration or repeal of any existing regulation, *or any resolution respecting the affairs of the Society*, and if dissatisfied with the answer of the Council *may if supported by the written requisition of not less than forty Fellows*, require that the proposal * be referred to a Special General Meeting, which the Council shall convene for that purpose within *two months* (instead of one month) after receiving such requisition."

Same Section, par. 3, to read:—

"A *month's* notice (instead of a week's) at least of the time when, and the object for which, every Special Meeting is to be holden, shall be sent to every Fellow residing in the United Kingdom. And no other business than that of which notice has been thus given shall be entered upon or discussed at such Meeting."

Same Section, par. 5:—

"Not fewer than *One hundred* Fellows (instead of twenty-five) must be present to *pass any resolution at* (instead of to constitute) a Special General Meeting."

D. W. FRESHFIELD,
H. SEEBOHM,
Hon. Secretaries.

These proposed alterations were unanimously adopted by the Meeting.

Special Evening Meeting, May 21, 1894.—CLEMENTS R. MARKHAM, ESQ., C.B., F.R.S., President, in the Chair.

ELECTIONS.—*F. T. Gervers; Captain Alfred H. Hill Gibbons* (*3rd Battalion East Yorkshire Regiment*); *Minor C. Keith; Professor Charles Lapworth, F.R.S.; Bertram de Quincey Quincey; William Frederick Teare; Major-General Robert J. Jocelyn Stewart.*

The Paper read was:—

"A Journey in the Hadramut." By J. Theodore Bent.

The Anniversary Meeting, May 28, 1894.—CLEMENTS R. MARKHAM, ESQ., C.B., F.R.S., President, in the Chair.

At the commencement of the proceedings the Honorary Secretaryt(Mr. DOUGLAS W. FRESHFIELD) read the rules which govern the business of the Meeting.

The President next appointed Mr. HUGH LEONARD and Mr. W. M. CORNER scrutineers for the ballot about to take place.

---

* In the circular calling the meeting the words "suggest" and "suggestion" were substituted for "propose" and "proposal" respectively. But the Meeting agreed with the President that the original words should be restored.

ELECTIONS.—*Gerald Blunt, B.A.; Major-General J. T. Crease, C.B. (Royal Marine Artillery); Rear-Admiral R. P. Dennistoun; Henry Fincham; Frederick Wm. Alfred H. Gillett; Thomas Henry Gurrin; George Christopher Morant; Commander Francis Curran Mullan; Lord Seymour; Rev. Martin E. Smit; Dr. A. Donaldson Smith; Vice-Admiral Richard E. Tracey; Charles Cheers Wakefield.*

The Annual Report of the Council was then read.

REPORT OF THE COUNCIL.

The Council have the pleasure of submitting to the Fellows the following Report on the general and financial condition of the Society:—

Membership.—The number of Fellows elected during the year ending April 30, 1894, was 240, and three Honorary Corresponding Members. In the previous year, 1892–93, the total elections amounted to 348, and in 1891–92 the number was 193. Our losses have been, by death 86 (besides two Honorary Corresponding Members), by resignation 51, and by removal on account of arrears of subscription 75; making an increase for the year of 29 Fellows. In the year 1892–93 there was an increase of 166, in 1891–92 a decrease of 23. The total number of Fellows on the list (exclusive of Honorary Members) on May 1 was 3775.

Finance.—As will be seen by the annexed Balance Sheet, the total net income for the Financial year ending December 31, 1893 (*i.e.* exclusive of balance in hand and sale of Stock), was 11,050*l.* 2*s.* 1*d.*, of which 7458*l.* 10*s.* consisted of entrance fees and subscriptions of Fellows. In the previous year, 1892, the total net income was 9299*l.* 18*s.* 7*d.*, and the amount of subscriptions, etc., 7007*l.*; in 1891 the two totals were 8322*l.* 16*s.* 8*d.* and 6067*l.* respectively.

The net expenditure for the past year (*i.e.* exclusive of balance in hand and purchase of Stock) was 11,584*l.* 2*s.* 3*d.* The net expenditure in 1892 was 9012*l.* 7*s.* 5½*d.*; in 1891, 8171*l.* 3*s.* 9*d.*

The Finance Committee of the Council have held, as usual, Meetings during the year, supervising the accounts of the Society. The Annual Audit was held on April 20 last, the Auditors being, on behalf of the Council, Sir Rawson W. Rawson and Major Leonard Darwin, and on behalf of the Fellows at large, E. O. Tudor, Esq., and J. Duncan Thomson, Esq. The cordial thanks of the Council and Fellows are due to these gentlemen for having freely devoted their valuable time to this important task. At the end of their labours the Auditors drew up the following Report to the Council:—

Auditors' Report.—"The Auditors appointed to examine the Accounts of the Royal Geographical Society for the year ended December 31, 1893, have examined the Balance Sheet submitted to them, and having compared it with the Books and Vouchers, have found it correctly stated and sufficiently vouched.

"The Books have been kept and the Accounts rendered in the usual satisfactory manner.

"The Balance Sheet shows a large increase both of Receipts and Expenditure. The gross amount on both sides of the account is 12,738*l.*; the corresponding figure in 1892 was 9570*l.* But if balances and investments be excluded, the net receipts of last year exceeded those of 1892 by 1751*l.*, and the net expenditure exceeded that of 1892 by 2572*l.* The net expenditure of 1893 exceeded the net receipts by 533*l.*, which was covered by the balance in hand at the commencement of that year.

"The Auditors would call the attention of the Council to the large increase in the Expenditure of the Society in the last two years, but would at the same time point out that there has been a large, although scarcely corresponding, increase in the Receipts.

"Thus, the net Receipts and Expenditure of the last four years, exclusive of Balances and Investments, or sales of Stock, have been as follows:—

	Net Receipts. £	Net Expenditure. £	Difference. £
1890 ..	9532	8219	1313 +
1891 ..	8323	8171	152 +
1892 ..	9300	9012	288 +
1893 ..	11,051	11,584	533 −

"The receipts of the year 1890 were exceptionally increased by the unusual accession of Fellows and the Sale of Tickets for the Reception at the Albert Hall on the occasion of the return of Mr. H. M. Stanley; in like manner those of 1893 were exceptionally increased by the Earl of Derby's Legacy of 1000*l.*; by the facility newly offered to Fellows in connection with Life Compositions, of which 26 have availed themselves, and by the increase of the Entrance Fee from 3*l.* to 5*l.*, which increase was paid by 199 Fellows in 1893. In estimating the Revenue of the current and future years, the casual nature of the first two items must be kept in view.

"With regard to the expenditure of the year, it is satisfactory to note that the expenses of the permanent establishment, 4318*l.*, were somewhat less than in 1892. The large increase above noticed may be divided into six heads, none of which is necessarily of a recurrent nature, and all of which can be kept down, if desirable, to meet the limits of the annual income, viz.:—

	Increase. £
1. Monthly *Journal*—Printing, Maps, Contributors, Postage	1069
2. Supplementary Papers (Spent in 1892, 86*l.*)	571
3. Scientific Instruction—Cambridge Lectures, 300*l.*, and Educational Lectures	628
4. Preparation of Library Catalogue	120
5. Evening Meetings—Hand Maps and Refreshments	205
6. Admission of Ladies Controversy—Printing and Legal Expenses ..	282
	£2875

"The Auditors are informed that the increase under the first head arose mainly from the change in the form of the *Journal*, and was partly met by an increased sale and receipts for advertisements.

"The unpublished 'Supplementary Papers' had been accumulating for the last three years; one-half of the cost of Lectures was covered by fees for admission.

"It will be observed that Lord Derby's Legacy of 1000*l.* has been invested, and that to meet current expenses a nearly equal sum has been withdrawn from the invested funds of the Society. The amount of the total investments therefore remains about the same as at the last Audit, viz. 21,602*l.* 12*s.* 4*d.* The details are stated in the Balance Sheet.

"The present value of this Stock is estimated at 27,133*l.* 3*s.* 10*d.*

"The total Assets of the Society, estimated in 1892 at 48,185*l.* 14*s.* 7*d.*, may be estimated at present at 47,745*l.* 3*s.* 0½*d.*, the reduction being caused by the difference between the amounts of the balance at the commencement and close of the year.

"Rawson W. Rawson,
"Leonard Darwin,
"J. D. Thomson,
"E. O. Tudor,
} *Auditors.*

"*April* 20, 1894."

Receipts. **BALANCE SHEET FOR THE YEAR 1893.** *Expenditure.*

1893.	£ s. d.	£ s. d.	1893.	£ s. d.	£ s. d.
Balance in Bankers' hands, Dec. 31, 1892	546 19 2		*House:*—		
Do. Accountant's do.	11 3 2		Taxes and Insurance ..	97 10 0	
		558 2 4	Repairs and Furniture..	152 12 10	
Subscriptions:—			Coals, Gas and Water ..	88 11 6	
Arrears	252 0 0		Miscellaneous..	131 14 2	
For the current year ..	4036 0 0				470 8 6
Paid in advance	766 0 0		*Office:*—		
		5054 0 0	Salaries and Gratuity ..	1018 0 0	
Entrance Fees	.. ..	1304 0 0	Stationery and Printing	439 2 0	
Life Compositions	.. ..	1100 10 0	Miscellaneous	241 1 0	
Parliamentary Grant ..	.. ..	500 0 0			1698 3 0
Royal Premium	.. ..	52 10 0	*Library:*—		
Rent of Shop	.. ..	107 10 0	Salaries	330 0 0	
			Purchase of Books ..	120 4 0	
Publications:—			Binding	61 2 0	
Sale of Publications ..	623 14 0		Preparing Library Catalogue	120 0 0	
Advertisements	164 0 0		Miscellaneous	79 18 0	
		787 14 0			711 4 0
Payments for Scientific Instruction	.. ..	60 5 0	*Map-room:*—		
Educational Lectures:—			Salaries	526 10 0	
Sale of Tickets	.. ..	134 18 0	Purchase of Maps, &c...	73 13 11	
Payments in error	.. ..	65 8 9	Repairs to Instruments	16 11 6	
Loan of Slides, &c.	.. ..	6 6 6	Miscellaneous	75 14 9	
Legacy from the late Earl of Derby	.. ..	1000 0 0			692 10 2
Sale of 1150*l. Consols* ..	.. ..	1129 16 6	*Map-Drawing Room:*—		
			Salaries	366 13 4	
Dividends:—			Miscellaneous	10 14 11	
North-Eastern Railway 4 per cent. Debenture Stock .. .. 1000*l.*	38 19 2				377 8 3
Great Indian Peninsula Railway 5 per Cent. Stock .. .. 4850*l.*	289 2 7		*Meetings:*—		
Great Western Railway 4½ per Cent. Stock [Davis bequest] 1800*l.*	74 10 1		Evening Meetings (includes Lantern Slides, Reporting, Refreshments, &c.	437 6 2	
London and North-Western Railway 4 per Cent. Stock [Murchison bequest] 1000*l.*	38 19 2		Hand Maps	95 15 0	
Caledonian Railway 4 per Cent. Preference Stock .. .. 2000*l.*	77 17 10		Anniversary Dinner ..	45 7 0	
Norwegian 4 per Cent. Bonds .. .. 1000*l.*	38 18 4		*Admission of Ladies:*		
New Zealand 4 per Cent. Stock . 1000*l.*	38 16 8		Legal Expenses . 114 6 0		
New South Wales 3½ per Cent. Stock [Gill Memorial] 1023*l.* 5*s.* 6*d.*	35 0 4		Printing and Postage of Circulars, &c. 168 2 8	282 8 8	
India Stock .. 1000*l.*	31 12 4		Miscellaneous	59 3 8½	
India 3½ per Cent. Debentures . 1000*l.*	34 1 2				920 0 6½
Consols . 2519*l.* 2*s.* 2*d.*	98 3 6		*Medals and other Awards*	.. ..	243 12 9
„ [Peek Fund] 1000*l.*	26 15 2		*Scientific Purposes and Education:*—		
„ [Back bequest] 561*l.* 0*s.* 8*d.*	15 0 4		Scientific Instruction ..	164 5 0	
„ [Trevelyan bequest] 510*l.* 4*s.* 0*d.*	13 12 8		Cambridge University (Geo. Lect., 2 yrs.)	300 0 0	
Metropolitan 3½ Consols 1000*l.* [Derby Legacy]	25 10 6		Oxford University ..	150 0 0	
			Oxford University (Studentship)	50 0 0	
		876 19 10	Owens College	50 0 0	
			Educational Lectures ..	232 5 6	
			Miscellaneous	55 0 0	
					1001 10 6
			Publications:—		
			Printing *Journal* (Jan.) to Nov.)	1592 9 3	
			Maps and Illustrations for *Journal* ..	1247 17 6	
			Postage of *Journal* ..	401 19 5	
			Payments to Contributors	300 0 0	
			Printing 'Supplementary Papers' ..	497 18 3	
			Maps for 'Supplementary Papers' ..	160 17 0	
			Maps for *Proceedings* ..	87 4 7	
			Payment to Chandra Das	100 0 0	
			Editor of Publications ..	200 0 0	
			Miscellaneous	132 12 6	
					4720 18 6
			Payments in error returned	.. ..	31 0 0
			Expeditions and aid to Travellers:—		
			Grant to Mr. Conway ..	300 0 0	
			Grant to Asia Minor Exploration Fund ..	100 0 0	
			Grant to Mr. Becher ..	100 0 0	
			Instruments	217 6 0	
					717 6 0
			Purchase of Stock:—		
			Purchase of 1000*l.* Metropolitan 3½ (Derby Legacy) ..	.. ..	1150 0 6
			Balance in Bankers' hands, Dec. 31, 1893	163 0 6	
			Do. Accountant's do.	9 10 8½	
				172 11 2½	
			Deduct cheques not cashed	168 13 0	
					3 18 2½
	£12,738 0 11				£12,738 0 11

E. L. S. COCKS,
Treasurer.

Audited and found correct, April 20, 1894.

RAWSON W. RAWSON,
LEONARD DARWIN,
J. D. THOMSON,
E. O. TUDOR,
} *Auditors.*

STATEMENT showing the RECEIPTS and EXPENDITURE of the Society from the Year 1848 to December 31, 1892.

Year.	Cash Receipts within the Year. £ s. d.	Cash Amounts invested in Funds. £ s. d.	Deducting Amounts invested in Funds; actual Expenditure. £ s. d.
1848	696 10 5	.. ..	735 6 1
1849	778 3 0	.. ..	1098 7 6
1850	1036 10 5	.. ..	877 2 10
1851	1056 11 8	.. ..	906 14 7
1852	1220 3 4	.. ..	995 13 1
1853	1917 2 6	.. ..	1675 6 0
1854	2565 7 8	.. ..	2197 19 3
1855	2584 7 0	.. ..	2636 3 1
1856	[1] 3372 5 1	533 10 0	2814 8 1
1857	3142 13 4	378 0 0	3180 19 9
1858	3089 15 1	.. ..	2944 13 6
1859	3471 11 8	950 0 0	3423 3 9
1860	[2] 6449 12 1	466 17 6	5406 3 7
1861	4792 13 9	1358 2 6	3074 7 4
1862	4659 7 9	1389 7 6	3095 19 4
1863	5256 9 3	1837 10 0	3655 4 0
1864	4977 8 6	1796 5 0	3647 7 10
1865	4905 8 3	1041 5 0	4307 4 5
1866	5085 8 3	1028 15 0	4052 15 0
1867	5462 7 11	1029 0 6	3943 17 4
1868	5991 4 0	1857 3 9	4156 17 10
1869	[3] 6859 16 0	2131 5 0	4646 0 8
1870	[4] 8042 6 1	3802 6 0	3845 10 6
1871	[5] 6637 3 7	1000 0 0	3726 4 4
1872	[6] 8119 7 9	1999 4 6	5871 13 2
1873	[7] 7761 18 10	2015 1 8	6697 12 6
1874	[8] 8753 5 10	499 0 0	7876 2 3
1875	7934 15 10	2002 7 6	5683 4 10
1876	[9] 11611 11 8	.. ..	6870 13 1
1877	[10] 7950 1 11	2538 2 0	8940 17 11*
1878	[11] 8124 10 0	3000 0 0	6361 9 6
1879	[12] 8979 14 10	1551 10 10	6990 14 2
1880	8599 18 4	1567 5 1	8454 1 10†
1881	8809 19 5	.. ..	8362 5 6‡
[13] 1882	[13] 8942 15 0	.. ..	8779 10 7
1883	[14] 9599 9 0	1001 5 0	8624 2 11
1884	[15] 8964 11 7½	.. ..	9286 0 5
1885	[16] 8738 12 3	.. ..	8555 3 10½
1886	[17] 7968 9 0	1000 0 0	7767 18 0½
1887	8007 16 3	.. ..	8493 10 3
1888	8053 5 0	.. ..	7908 18 6
1889	8224 7 7	1000 0 0 On deposit.	7025 15 10
1890	9531 16 2	850 0 0	8218 5 10
1891	8322 16 8	1000 0 0	8171 3 9
1892	9299 18 7	.. ..	9012 7 5½
1893	[18] 11050 2 1	1150 0 6	11584 2 3

[1] Includes Treasury Grant of 1000*l.* for the East African Expedition.
[2] Includes Treasury Grant of 2500*l.* for the East African Expedition.
[3] Includes Legacy of Mr. Benjamin Oliveira, 1506*l.* 17*s.* 1*d.*
[4] Includes Legacy of Mr. Alfred Davis, 1800*l.*
[5] Includes Legacy of Sir Roderick Murchison, 1000*l.*
[6] Includes Mr. James Young's Grant for Congo Expedition, 2000*l.*
[7] Includes 1009*l.* 14*s.* 6*d.*, sale of Exchequer Bills.
[8] Includes Mr. James Young's Grant for the Congo Expedition, 1041*l.* 14*s.*
[9] Includes Parliamentary Grant of 3000*l.* to Cameron Expedition.
[10] Includes Donation of 500*l.* by Mr. C. J. Lambert.
[11] Includes Legacy of Admiral Sir George Back, 540*l.*
[12] Includes Legacy of Sir W. C. Trevelyan, 500*l.*
[13] Includes 1005*l.* 8*s.* 2*d.*, sale of Exchequer Bills.
[14] Includes 1000*l.* received from Mr. B. Leigh Smith.
[15] Includes 500*l.* on loan from Bankers.
[16] Includes 998*l.* 0*s.* 10*d.*, sale of India Debentures.
[17] Includes Donation of 1000*l.* from M[lss] Gill.
[18] Includes Legacy of the Earl of Derby, 1000*l.*

* This sum includes the Special Parliamentary Grant transferred to the Cameron Expedition Fund in February, 1877.

† This amount includes the payment of two sums of 500*l.* each, contributed to the African Exploration Fund in this and the previous year.

‡ This sum includes the payment of 102*l.* 8*s.* to the African Exploration Fund; also 714*l.* 9*s.* 1*d.*, the final payment for Cameron Expedition Fund.

STATEMENT OF ASSETS.—December 31, 1893.

	£ s. d.	£ s. d.
Freehold House, Fittings, and Furniture, estimated (exclusive of Map Collections and Library insured for 10,000*l.*)	.. ..	20,000 0 0
Investments (amount of Stock), as detailed in the above Report of the Auditors, valued March last at	.. ..	27,133 4 10
Arrears due on December 31, 1893, £1521. Estimated at	.. ..	608 0 0
Balance at Bank	£163 0 6	
„ in Accountant's hands	9 10 8½	
	172 11 2½	
Deduct Cheques not cashed	168 13 0	
		3 18 2½
Total		£47,745 3 0½

ESTIMATE FOR THE YEAR 1894.

Receipts.	£	s.	d.
Subscriptions	5060	0	0
Entrance Fees	900	0	0
Life Compositions	1000	0	0
Parliamentary Grant	500	0	0
Royal Premium	52	10	0
Rent of Shop	80	0	0
Publications	1100	0	0
Payments for Scientific Instruction	45	0	0
Payments made in error	65	0	0
Loan of Diagrams and Slides	9	0	0
Educational Lectures	50	0	0
Sale of *Proceedings* (Old Series)	100	0	0
Dividends	880	0	0
Total	£9841	10	0

Expenditure.	£	s.	d.
House	416	18	0
Office	1642	0	0
Library	790	0	0
Printing Catalogue	335	0	0
Map Room	681	10	0
Map-Drawing Room	260	0	0
Meetings	324	2	0
Medals and other Awards	245	0	0
Scientific Purposes	640	0	0
Publications:			
Journal	3100	0	0
'Supplementary Papers'	262	0	0
Mr. Rockhill (editing Chandra Das's Reports)	150	0	0
Mr. Conway's Map	100	0	0
'Hints to Travellers': Printing, Maps, and Contributors	420	0	0
Expeditions	100	0	0
Payments in error returned	40	0	0
Balance available for contingencies	335	0	0
Total	£9841	10	0

Publications.—The monthly *Journal* has been issued with regularity throughout the year; the twelve numbers for 1893 forming two volumes of 1222 pages, illustrated by 49 maps and 31 illustrations. The total cost of the edition of 5500 copies (including 441*l.* 16*s.* 11*d.* for free delivery to Fellows and Institutions) was 4035*l.* 9*s.* 10*d.* From this is to be deducted the amount of 787*l.* 14*s.* received from sale of copies to the public and from advertisements. The sum of 658*l.* 15*s.* 3*d.* was expended on 'Supplementary Papers.'

The publication of a series of Extra Volumes was begun during the year, the first of the series being Mr. Beardoe Grundy's 'Topography of the Battlefield of Platæa.' These Extra Volumes will consist of memoirs and narratives that could not conveniently be included in the *Journal* or issued as gratis 'Supplementary Papers,' and will be procurable by Fellows at lower rates than by the general public.

Library.—During the past year 566 books and pamphlets, in addition to serial publications, have been added to the Library—439 by donation and 127 by purchase; 333 pamphlets have been put in covers by the Society's map-mounter,

and 170 volumes have been bound. The sum of 142*l.* 19*s.* 5*d.* has been spent in purchasing books, and the further sum of 74*l.* 4*s.* in binding for the Library.

Library Catalogues.—It was decided, instead of issuing a third supplement to the Authors' Catalogue, to recast the whole work, and procure a new Catalogue in one volume, brought down to the close of 1893. The larger part of this Catalogue is in type, and the whole will soon be ready. Work has been carried forward steadily on the Subject Catalogue, which is complete for all accessions to the Library since January, 1892, and for all titles entered in the old Authors' Catalogue. The indexing for this Catalogue of periodicals earlier in date than 1892 has proved more arduous than was anticipated, but the great utility of the work justifies the time expended on it.

Scientific Purposes Grant.—During the past year 32 intending travellers have received instruction from Mr. Coles, in Practical Astronomy, in the Society's Observatory, and in route surveying with the theodolite, prismatic compass, and plane-table, in the country, and 479 hours have been devoted to teaching.

Instruments to the value of 605*l.* 13*s.* 6*d.* have been lent during the past year to the following travellers:—Rev. Walter Weston (Japan), 10*l.* 10*s.*; Mr. H. M. Becher (Malay Peninsula), 74*l.*; Dr. H. R. Mill (English Lakes), 12*l.* 13*s.*; Mr. W. H. Cozens-Hardy (Montenegro), 91*l.* 15*s.* 6*d.*; Mr. A. Trevor-Battye (Arctic Regions), 6*l.* 14*s.*; Mr. John Revilliod (South America), 59*l.* 4*s.*; Mr. G. F. Scott Elliott (Central Africa), 26*l.* 14*s.*; Captain Webster (New Guinea), 61*l.* 17*s.* 6*d.*; Mr. D. G. Hogarth (Asia Minor), 5*l.* 15*s.*; Major Hon. M. G. Talbot, R.E. (Upper Egypt), 37*l.*; Rev. C. H. Robinson (Sahara), 4*l.* 17*s.* 6*d.*; Mr. G. B. Grundy (Italy), 7*l.* 16*s.*; Mrs. Bishop (Korea), 5*l.* 6*s.* 6*d.*; Mr. H. H. Johnson (Nyasaland), 90*l.* 7*s.*; Lieut. F. W. Green, R.A. (Asia Minor), 4*l.* 10*s.*; Mr. R. T. Coryndon (Mashonaland), 32*l.* 13*s.* 6*d.*

The instruments lent to the following gentlemen have been returned during the past year, with the exception of those which have been lost:—Mr. G. B. Grundy (Bœotia), 1892; Captain H. W. Dowding, R.N. (Upper Amazons), 1893; Captain H. Picot, I.S.C. (Central Asia), 1893; Dr. H. R. Mill (English Lakes), 1893; Mr. W. H. Cozens-Hardy (Montenegro), 1893; Mr. St. G. R. Littledale (Central Asia), 1893; Mr. H. M. Becher (Malay Peninsula), 1893; Mr. John Revilliod (South America), 1893; Major Hon. M. G. Talbot, R.E. (Upper Egypt), 1894.

The following is a list of travellers who still have instruments lent to them in their possession:—Mr. W. Deans Cowan (Madagascar), 1883; Mr. A. R. Colquhoun (Burma), 1883; Mr. E. Douglas Archibald (for cloud observations in England), 1885; Mr. T. Bevan (New Guinea), 1887; Mr. H. H. Johnston (Nyasaland, Central Africa), 1889–91 and 1894; Rev. A. Hetherwick (South-East Africa), 1891; Dr. D. Kerr Cross (South-East Africa), 1891; Sir C. M. Macdonald (Niger Region), 1891; Mr. C. W. Campbell (Korea), 1893; Lieut. Coningham (Persia), 1893; Sir William Macgregor (New Guinea), 1893; Mr. J. C. White (Sikkim), 1893; Mr. R. M. W. Swan (South-East Africa), 1893; Rev. Walter Weston (Japan), 1893; Mr. A. Trevor-Battye (Arctic Regions), 1893; Mr. G. F. Scott Elliott (Central Africa), 1893; Captain Webster (New Guinea), 1893; Mr. D. G. Hogarth (Asia Minor), 1893; Rev. C. H. Robinson (Sahara), 1893; Mr. G. B. Grundy (Italy), 1893; Mrs. Bishop (Korea), 1894; Lieut. F. W. Green, R.A. (Asia Minor), 1894; Mr. R. T. Coryndon (Mashonaland), 1894.

Map Room.—The accessions to the Map Room Collection during the past year comprise 745 Maps and Charts on 1197 sheets; 48 Atlases (including continuations) containing 696 sheets of Maps, 1463 Photographs, 46 Illustrations, and 406 Lantern Slides. Of these, 90 Maps on 290 sheets, 14 Atlases, 905 Photographs, and 401 Lantern Slides have been purchased.

The adoption of the Report was moved by Major-General GOODENOUGH, and seconded by Sir JOHN SWINBURNE, Bart.

PRESENTATION OF THE ROYAL MEDALS AND OTHER AWARDS.

The Royal Medals and other Awards for the Encouragement of Geographical Science and Discovery were then presented by the PRESIDENT.

The Founders' Medal had been awarded to Captain H. BOWER for his journey across Tibet from east to west in 1891–2. In handing the medal to General Mylne for transmission to Captain Bower, the PRESIDENT said:—The Founder's Medal has been adjudicated to Captain Bower for the remarkable journey he made through Tibet from east to west, during which he traversed an immense extent of unknown country upwards of 1000 miles, and in the survey work over the parts which had been traversed before, he rectified the maps in many instances. I regret that Colonel Bower is not able to be present to receive the medal for his nephew, who is in India, but another relative, General Mylne, has come to do so. This adjudication of the highest honour we can confer will, I feel sure, convince Captain Bower that his splendid exploring work has been fully and cordially appreciated at home, and I believe also it will incite him to further efforts to achieve still more valuable and important work for geography in the time to come. I have great pleasure in reminding you that there is a very peculiar circumstance connected with the journey of Captain Bower—that is, that he is the very first officer since the time of Warren Hastings who has received official permission to travel in Tibet. In a recent letter I have received from the Marquis of Lansdowne, late Viceroy of India, who gave that permission, and who was Captain Bower's superior at that time, there is a passage which I think it well to read:—"Your reference to Bower's exploration is very satisfactory to me; it was a fine performance, and very creditable to the young officer who accomplished it." I believe that from one point of view Captain Bower will be as gratified with this recognition of his valuable work from his official superior, as from another point of view he will appreciate the honour the Royal Geographical Society has conferred upon him. I now present to you the Founders' Medal, and request you will have the kindness to transmit it to your relative.

The Patron's Medal had been awarded to M. ELISÉE RECLUS on the completion of his great work, 'La Nouvelle Géographie Universelle.' In handing it to Mr. Douglas Freshfield, M. Reclus's proposer, the PRESIDENT said:—The Patron's Gold Medal has been conferred upon the eminent French geographer, M. Reclus. I regret that through illness M. Reclus is unable to be present, and also that his Excellency the French Ambassador cannot attend this afternoon, to receive the award which has been adjudicated to his accomplished and, I may say, illustrious fellow-countryman. France is the country where scientific and critical geography first found a home some two centuries ago, and its men of science have well sustained the tradition of their predecessors during the intervening period. Geographers, at all events, have always in their rivalry felt that it was a friendly rivalry. Our ancestors admired the work of D'Anville, and we showed our appreciation of it when, shortly after his death, the greatest of English geographers arose, in the person of Major Rennell, and we gave him the name of the English D'Anville. Well, we have always taken that view with regard to France. We have admired the gifts of the people of that great country across the Channel, admired their talents, and emulated and tried to excel them in the field. As geographers, we have thought and spoken of France in the same way that Sir Philip Sidney, in one of his sonnets, wrote o her, as "that sweet enemy France"—a peculiarly happy phrase, because it implies both a friendship and a rivalry. The mantles of Sanson, Delisle, and D'Anville have

now fallen on the shoulders of Reclus. It was a gigantic task he set before himself when he undertook the great work now completed—a work which involved years and years of study, and visits to many countries for geographical investigation; and I feel sure that the Society will join with me in congratulating him on the completion of a work that has occupied him incessantly for twenty years. Mr. Douglas Freshfield has kindly undertaken to receive the Patron's Medal, and to transmit it to the French geographer.

On receiving the Medal, Mr. D. FRESHFIELD spoke as follows:—M. Reclus charges me to communicate through you, sir, to the Society his very deep appreciation of the honour done to him by the award of one of our Gold Medals. I have also to express his sincere sorrow that he has been prevented, by the state of his health and doctor's order, from crossing the Channel in order to be present here to-day. Further, we cannot but express regret that the unfortunate inability of his Excellency the French Ambassador to be with us this afternoon, deprives us of the pleasure of expressing through him to the French nation the satisfaction it has been to the Council to endorse the judgment expressed last year by the French Geographical Society in conferring their highest award on M. Reclus. In this double default it falls upon me, as the member of Council responsible for formally introducing M. Reclus's claims to the notice of my colleagues, to receive the medal on his behalf. M. Reclus, I am sure, would not desire me, speaking as I am to-day as his representative, to dwell at length on his personal services to geography. They have been briefly, but not inadequately, summarized by the President. I will rather, with your permission, occupy a few minutes in calling attention to those special qualities in French travellers and geographers which we recognize to-day. A traveller, like Julius Cæsar, must not only arrive; he must see, and grasp what he sees, so as to be able to communicate it to others—at least, if he cannot do this, he is hardly a geographer in the primitive and true sense of the word. We English boast that we are the greatest travellers in the world, but are we the best geographers? Germany runs us hard. And the French genius, we must admit, brings its own special and characteristic contributions to geographical science. It links it with literature and with art. What descriptions of strange scenes can surpass in vividness those of the Sahara we owe to Fromentin, or those of the deltas of Tonkin and the wilds of Morocco given us by Pierre Loti? Nor are our neighbours less successful in linking art and geography. Thanks partly to the liberality of their Government, partly to the resources of their great publishing houses and the intelligence of their craftsmen, they produce works illustrated in a manner we in London are only beginning to rival. But literary style and artistic embellishment are, after all, mere surface ornaments in the opinion of many—of all Philistia. The French bring to our science other qualities which go to the very root of the matter. One of the dangers that beset the geographical student is that of losing his own way and bewildering his followers among interminable details. In every work published in France, from a child's school-book to the 20 volumes of M. Reclus's encyclopædia, we find that lucid method, that order, that art of *étalage*, that swiftness in seizing characteristic points and generalizing from them, that marks the Gallic genius. It is now thirty-five years since M. Reclus, as he tells us in a passage which was, perhaps, inspired by an English historian, sitting on a grassy mound above the shallows of the Shannon, planned and pencilled down on the spot the first outlines of the great work he has now brought to a happy conclusion. 'La Terre et les Hommes' is its second title. To give a faithful picture of the earth as the home of humanity was its idea. To that purpose he has remained true through the working years of a lifetime. He has travelled himself in many parts of the world, including South America. He has drawn round him a staff of

competent helpers. He has never missed a single date in a fortnightly publication. The result is a splendid monument of perseverance and of intelligence. Perfect M. Reclus would not pretend it to be. National genius as well as individual has the defects of its qualities, and M. Reclus is "French of the French." Politicians, as Praed long ago told us, are apt to be "just Eton boys grown heavy;" and England and France, like Eton and Harrow, are too close neighbours not to be also rivals. But I am only repeating the concluding words of M. Reclus's last volume when I record the expression of his trust that his labours may serve to bring forward the day when our descendants will have learnt to lay aside their jealousies, and to make the best not only of their planet but of one another.

The PRESIDENT, in handing the Murchison Grant to Captain Wiggins, said:—Captain Wiggins, the Murchison Grant has been awarded to you. I have felt for a very long time now that your great services to geography demanded some recognition from this Society. It is only five years since I had the great pleasure of making your personal acquaintance, but I have been very familiar with all you have done for upwards of twenty years, before you sailed in the *Diana* in 1874, and I rejoiced when you broke the spell and passed through those straits which had stopped all the earlier navigators, and made your way to the Yenisei. It was through your resolution, determination, and excellent seamanlike qualities that a new route has been opened for commerce in that part of the world. You are the pilot of the Kara Sea, and I understand that you have received a recognition of your services from His Imperial Majesty the Emperor of Russia; I am sure no man deserved it better. I cannot help also congratulating you on having had such a shipmate as Miss Peel, whose charming book has been published, containing an admirable account of the voyage. The Murchison Grant is in a peculiar way fitted for the recognition of your services, for Sir Roderick took the deepest interest in ice navigation, as well as in the commercial prosperity of Siberia and Russia. I have great pleasure in presenting you with the Murchison award in the form I believe you wish it should take.

In presenting the Cuthbert Peek Grant to Dr. J. W. GREGORY, the PRESIDENT said:—The Cuthbert Peek Grant has been adjudicated to Dr. Gregory. We all admired the resolution with which Dr. Gregory determined to do some good geographical work when the Villiers Expedition broke down, and the way in which he organized a small expedition when he was thrown on his own resources. I think that many men in your predicament would have given the matter up, but you resolutely went forward and did most admirable geographical work in the Mount Kenia region and towards Lake Baringo. The Council was particularly impressed with the importance of scientific attainments in a traveller in considering the results of your work, and I think they were influenced a great deal by their desire to give effect to that feeling when they decided upon adjudicating to you the Cuthbert Peek Grant. I now have great pleasure in presenting you with the diploma, and I believe that the grant itself has taken the form you wished it to take, and is ready for you.

The Gill Memorial, the PRESIDENT stated, is awarded to Mr. FERGUSON, who, having first qualified himself as a traveller, has made valuable observations and route surveys and has constructed excellent maps, both when employed on the commission of the German boundary and afterwards on several other occasions, especially throwing great light on the geography of the interior of the Gold Coast. I have great pleasure in presenting Mr. Ferguson's award to Colonel Dalton, if he will be so kind as to take it for him.

The PRESIDENT then said:—Captain SNOW has been selected for the Back Grant for two years, which we have it in our power to confer this year, for most

valuable work in surveying and adding to the correctness of the maps of the Kurile Islands. I regret that he is not present to receive it himself.

The PRESIDENT then presented the prizes which had been gained by the Training College Students.

MALE STUDENTS—*Prizes*—(£5 each):—W. B. Alexander, Peterborough Training College; H. Copping, York Training College; E. Lupton, Culham Training College. *Book Prizes*:—C. Gould, Battersea Training College; H. Milnes, Borough Road Training College; W. Pope, Chelsea Training College; A. Purkington, Homerton Training College. FEMALE STUDENTS—*Prizes*—(£5 each):—A. M. Barnes, Tottenham Training College; D. Capamagian, Stockwell Training College; M. M. Lee, Derby Training College. *Book Prizes*:—J. G. Beckett, Stockwell Training College; E. H. Bowyer, Stockwell Training College; A. J. Stone, Tottenham Training College; A. E. Thompson, Tottenham Training College.*

Mr. J. R. LANGLER then made some remarks, pointing out the beneficial results which the awards of these prizes has had, and the more beneficial results likely to follow from the change to be introduced in the future.

THE BALLOT FOR THE COUNCIL, 1894-95.

The PRESIDENT then announced that, according to the report of the scrutineers, the list as proposed by the Council had been duly elected.

The list is as follows, the names of new members, or those who change office, being printed in *italics*:—

President:—Clements R. Markham, Esq., C.B., F.R.S., F.S.A. *Vice-Presidents*: W. T. Blanford, Esq., LL.D., F.R.S., F.G.S.; Hon. G. C. Brodrick; *Hon. George N. Curzon*, M.P.; Sir Joseph Hooker, K.C.S.I., C.B., F.R.S.; General R. Strachey, R.E., C.S.I., F.R.S.; Captain W. J. L. Wharton, R.N., F.R.S. *Treasurer*: Edward L. Somers Cocks, Esq. *Trustees*: Right Hon. Lord Aberdare, G.C.B., F.R.S.; Right Hon. Sir John Lubbock, Bart., F.R.S., M.P. *Secretaries*: H. Seebohm, Esq., F.L.S.; *Major Leonard Darwin*, R.E., M.P. *Foreign Secretary*: *Sir John Kirk*, K.C.B., G.C.M.G., F.R.S. *Councillors*: Vice-Admiral Lindesay Brine; *Robert Brown*, M.A., PH.D., F.L.S.; Lieut.-Colonel James Cecil Dalton, R.A.; *Right Hon. Hugh C. E. Childers*, F.R.S.; *Lieut.-General W. H. Goodenough*, R.A., C.B.; Sir George D. Taubman Goldie, K.C.M.G.; Major-General Sir F. J. Goldsmid, K.C.S.I., C.B.; General Sir T. E. Gordon, K.C.S.I., C.B.; Wilfred Hudleston, Esq., F.R.S., F.G.S.; *Lord Lamington*; J. K. Laughton, Esq.; George Sutherland Mackenzie, Esq.; *Rear-Admiral Albert Hastings Markham*; John Murray, Esq.; Ernest G. Ravenstein, Esq.; Sir Rawson W. Rawson, K.C.M.G., C.B.; Howard Saunders, Esq., F.L.S., F.Z.S.; Colonel H. C. B. Tanner; *Rear-Admiral E. Hobart Seymour*, C.B.; Lieut.-Colonel C. M. Watson, R.E., C.M.G.; *Lieut.-Colonel J. K. Trotter*, R.A.

---

* The Medals, for the promotion of geographical education, placed by the Society at the disposal of the syndicates respectively of the Oxford and Cambridge Local Examinations, were awarded as follows:—

1893. Oxford (June).—*Silver Medal*—F. Cheeseright. *Silver Medal*—W. H. Wynn. *Silver Medal*—R. W. Davies. *Bronze Medal*—J. Duncan.

Cambridge (December).—*Silver Medal*—(Physical Geography)—Maud [M. G. E. Gillitlie. *Silver Medal*—(Physical Geography)—Leonard Blackler. *Silver Medal* (Political Geography)—Oliver G. Anderson. *Silver Medal*—(Political Geography)—John William Dodd.

The Prize Atlases offered by the Society for geographical proficiency to the cadets of the Nautical Training Colleges, on board H.M. ships, *Worcester* and *Conway*, were awarded, at the examination held in July, 1893, to the following:—Herbert Raymond Bateman (*Conway* training ship); James Graham Parry (*Worcester* training ship).

The PRESIDENT then proceeded to deliver his Anniversary Address, after which Sir Rawson W. Rawson spoke as follows:—I rise with very great pleasure to propose a hearty vote of thanks to our President for his most interesting address. There is an old English proverb that good wine needs no bush, and I need not say much to excite your enthusiasm on the present occasion, and to induce you to join with me in a very cordial vote of thanks to our President. I think that you will be prepared to accept the change that he proposes to make in the form of the address to be annually offered to the members. I can carry back my memory to the time when Mr. Hamilton first introduced the plan of taking up a subject to interest the Fellows at their annual meeting. I can carry back my memory to the time when the Society met in a small room in Regent Street, just below Jermyn Street, with perhaps thirty or forty members present, when there were not more than 300 Fellows in the Society, and we sat upon school-benches; when our income, instead of being, as we hear to-day, upwards of 10,000*l*., was about 1200*l*. We may congratulate ourselves upon the great progress the Society has made during these fifty years. What our President has told us to-day has not only satisfied us that geographical science is progressing, but that this Society is progressing with equal pace in assisting and directing that progress, and, as we have seen to-day, rewarding those who have been the active agents in advancing it. I have no doubt that under the presidency of Mr. Markham—upon whose appointment I think the Society may heartily congratulate itself, for I believe that if the mantle of Sir Roderick Murchison was transmitted to Sir Henry Rawlinson, he has passed it on to one of the most capable men to fill the post—the Society will progress greatly. You have seen to-day how capable he is from experience, from acquired knowledge, from his great zeal for the science to fill the post of President. I shall be very much disappointed if, under his guidance, the progress of the Society is not as rapid as it ever has been, and if its work is not even more solid and more useful to the country and to science generally. I have great pleasure in proposing a vote of thanks to Mr. Markham.

Admiral BRINE: I have very great pleasure in seconding that vote of thanks.

The PRESIDENT: I feel I do not in the least deserve all the very kind things said of me. I can assure the Society that so long as I am President it will be my earnest endeavour to promote the welfare of the Society in every possible way. I will say no more now, because I hope to meet you all this evening.

ANNIVERSARY DINNER.

The anniversary dinner was held on the evening of the anniversary meeting, May 28, in the Whitehall Rooms, Mr. Clements R. Markham, C.B., F.R.S., President, in the chair. Among those present were the Portuguese Minister, Sir F. Abel, Lord Aberdare, Admiral Lord Alcester, Lord Belhaven and Stenton, Mr. G. E. Buckle, Colonel G. E. Church, Mr. Edward Clodd, Hon. G. Curzon, Colonel J. C. Dalton, Major L. Darwin, Lord Egerton of Tatton, Sir J. W. Ellis, Bart., Sir John Evans, Colonel F. Farquharson, Sir W. H. Flower, Sir Geo. T. Goldie, General W. H. Goodenough, General Sir T. E. Gordon, General Gosset, Sir Charles Hall, Sir Henry Howorth, Mr. W. Hudleston, Professor D. E. Hughes, Mr. F. G. Jackson, General Sir Arnold Kemball, Mr. B. Kidd, Lord Lamington, Admiral A. H. Markham, Mr. Arthur Milman, Sir Frederick Milner, Bart., Mr. A. Milner, Mr. D. Morriss, Mr. J. Murray, General Mylne, Mr. C. E. Peek, Lord Percy, Señor Pezet the Peruvian Consul-General, Mr. E. G. Ravenstein, Sir Rawson W. Rawson, Lord

Ribblesdale, Sir A. Rollit, Mr. R. H. Scott, Mr. H. Seebohm, Lord Seymour, Mr. G. E. T. Smithson, Rev. S. A. Steinthal, Colonel H. C. B. Tanner, Mr. Maunde Thompson, Colonel Henry Trotter, Colonel J. K. Trotter, Admiral the Hon. W. J. Ward, Colonel C. M. Watson, Captain W. J. L. Wharton, R.N., Captain J. Wiggins.

After the usual loyal toasts, the PRESIDENT proposed the recipients of the Society's awards, to which Captain J. WIGGINS responded.

Sir GEORGE TAUBMAN GOLDIE proposed the "Guests," to which the Portuguese Minister responded.

The PRESIDENT proposed the "Sister Geographical Societies," which was responded to by Earl PERCY, President of the Tyneside Geographical Society.

The PRESIDENT proposed "The Navy and the Army," to which Rear-Admiral MARKHAM and Lieut.-General GODENOUGH responded.

Sir ALBERT ROLLIT proposed the final toast, "The President," to which Mr. MARKHAM responded.

GEOGRAPHICAL LITERATURE OF THE MONTH.

Additions to the Library.

By **HUGH ROBERT MILL, D.Sc.**, *Librarian*, **R.G.S.**

THE following abbreviations of nouns and the adjectives derived from them are employed to indicate the source of articles from other publications. Geographical names are in each case written in full :—

A. = Academy, Academie, Akademie.
Ann. = Annals, Annales, Annalen.
B. = Bulletin, Bollettino, Boletim.
Com. = Commerce, Commercial.
C. R. = Comptes Rendus.
Erdk. = Erdkunde.
G. = Geography, Geographie, Geografia.
Ges. = Gesellschaft.
I. = Institute, Institution.
J. = Journal.
M. = Mitteilungen.
Mag. = Magazine.
P. = Proceedings.
R. = Royal.
Rev. = Review, Revue, Revista.
S. = Society, Société, Selskab.
Sitzb. = Sitzungsbericht.
T. = Transactions.
V. = Verein.
Verh. = Verhandlungen.
W. = Wissenschaft, and compounds.
Z. = Zeitschrift.

On account of the ambiguity of the words *octavo*, *quarto*, etc., the size of books in the list below is denoted by the length and breadth of the cover in inches to the nearest half-inch. The size of the *Journal* is 10 × 6½.

EUROPE.

Alps—Tirol. *M. G. Ges. Wien* **37** (1894): 1-26. **Damian.**

Einzelne, wenig gewürdigte Hochgebirgs-seen und erloschene Seebecken um Sterzing. Von Josef Damian.

The author's earlier paper on the lakes near Trent was referred to in the Journal, vol. i. p. 350. Herr Damian now gives an account of the small Alpine lakes in the neighbourhood of Sterzing, and deduces various theoretical conclusions as to the formation of lake-basins in mountainous regions.

Austria—Bohemia. *Deutsche Rundschau G.* **16** (1894): 348-356. **Peter.**

Im Quellgebiete der Moldau. Ein Landschaftsbild aus dem Böhmerwalde. Von Johann Peter.

A short sketch of the country round the sources of the Moldau.

Belgium—Thielen. *B.S.R. Belge G.* **18** (1894): 138-152. **Harou.**

Géographie locale. Thielen. Par Alfred Harou.

Eastern Europe. **Cole.**

The Gypsy Road. A journey from Krakow to Coblentz. By Grenville A. J. Cole. With Illustrations by Edmund H. New. London and New York, Macmillan & Co., 1894. Size 8 × 5½, pp. x. and 166. *Price* 6*s*. *Presented by the Publishers.*

Messrs. Cole and New travelled over one of the great international roads of Europe on bicycles, and the record of their impressions in word and sketch is exceptionally fresh and interesting.

England—Parish Boundaries. *J. Manchester G.S.* **9** (1893): 91–103. **Crofton.**

Vestiges of Village Communities. By Mr. H. T. Crofton.

An important paper illustrated by a coloured map.

France. **Baedeker.**

Northern France from Belgium and the English Channel to the Loire, excluding Paris and its Environs. Handbook for Travellers. By Karl Baedeker. Second edition. With 9 Maps and 27 Plans. Leipsic, Karl Baedeker; London, Dulau & Co., 1894. Size 6½ × 4½, pp. xliii. and 411. *Price* 7 *marks*. *Presented by Messrs. Dulau & Co.*

Several new routes have been added to the present edition.

France—Flanders. **Malotet.**

Rev. G. **33** (1893): 413–421; **34** (1894): 34–45; 193–200; 276–282.

La Flaudre Française. Par A. Malotet.

Herzegovina. **Déchy.**

Bergfahrten in den Alpen der Herzegowina. Von Moriz von Déchy. Seperat-Abdruck aus Nr. 350 und 351 vom 10 und 24 Juni 1892 der "Oesterr. Alpen-Zeitung." Vienna, 1892. Size 11½ × 8, pp. 16. *Plate.* *Presented by the Author.*

Hungary—Lake Balaton. **Loczy, etc.**

Rapport de la Commission d'Études du Lac Balaton pour 1891. (Extrait du bulletin de la Société hongroise de Géographie. Abrégé xix. année. Numero 9–10.) Size 9½ × 6, pp. 28. *Presented by Professor Loczy.*

This paper contains reports by Professor Loczy on the work of the Commission appointed for the scientific examination of Lake Balaton, and on the ancient terraces surrounding the lake bearing evidence as to its earlier levels. Dr. Vinzent de Borbas treats of the aquatic phanerogamic vegetation and floating islands, Dr. Istvanffi of the cryptogamic flora, and Dr. Eugene Daday of the microscopic fauna of the lake.

Italy—Lago di Cavazzo. *B.S.G. Italiana* (1894): 174–214. *Illustrations.* **Marinelli.**

Studi sul Lago di Cavazzo in Friuli, del socio Olinto Marinelli.

A survey of the lake of Cavazzo, with a photograph and a bathymetrical chart.

Rumania—Rivers. *B.S.G. Româna* **14** (1893): 1–320. **Chiru.**

Canalisarea Riurilor si Irigatiuni de C. Chiru.

An elaborate treatise on the canalization of rivers and their adaptation for irrigating adjoining land, mainly with reference to the rivers of Rumania. It is illustrated by innumerable diagrams, and a series of five maps of the Rumanian drainage basins. It is unfortunate that the Rumanian Society does not follow the example of the Hungarian, and publish an abstract of its publications in one of the well-known languages of Western Europe.

Scottish Land-Names. **Maxwell.**

The Rhind Lectures in Archæology. Scottish Land-Names, their origin and meaning. By Sir Herbert Maxwell. Edinburgh and London, Blackwood & Sons, 1894. Size 8 × 6, pp. ix. and 219. *Price* 6*s*. *Presented by the Publishers.*

This work embodies the Rhind Lectures in Archæology for 1893. Two chapters are devoted to "the lesson of place-names," and show how by the names it is often possible to trace the ancient divisions of the land, the distribution of vanished tribes, the former extent of pasture and woodland, the progress of religious influence, and the like.

ASIA.

Asia-Minor. **Deschamps.**

Gaston Deschamps. Sur les Routes d'Asie. Paris, A. Colin & Co., 1894. Size 7½ × 5, pp. 364. *Price* 3*s.*

The author traversed Asia-Minor from the Levant to Kurdistan, but his narrative would have been much simplified had it been accompanied by a map of the route.

Central Asia. *Petermanns M.* **40** (1894): 106–112. **Krahmer.**

Die Expedition der Kaiserl. Russischen Geographischen Gesellschaft nach Mittel-Asien. Von Generalmajor z. D. Krahmer.

China—Formosa Channel. *Ann. d. Hydrographie* **22** (1894): 121–131. *Map.* **Makaroff.**

Die Hydrographie der Formosa-Strasse in ihrer Bedeutung für die praktische Schiffahrt. Von Kontre-Admiral S. Makaroff in St. Petersburg. Nebst Bemerkungen von Dr. G. Schott in Hamburg.

Cochinchina. **Guerlach.**

Missions Catholiques **26** (1894): 9, 21, 32, 46, 70, 81, 94, 107, 115, 132, 140, 157, 169, 182, 193, 206, 219, 241. *Illustrations.*

Chez les sauvages de la Cochinchine Orientale, Bahnar, Reungao, Sédang. Par M. Guerlach, des Missions Etrangères de Paris.

Early Cartography. **Kramp.**

Japan or Java? an Answer to Mr. George Collingridge's article on "The Early Cartography of Japan." By F. G. Kramp. Overgedrukt nit het "Tijdschrift van het Koninklijk Nederlandsch Aardrijkskundig Genootschap, Jaargang 1894." Leiden, E. J. Brill, 1894. Size 9½ × 6, pp. 14. *Presented by the Author.*

This criticism will be summarized in an early number.

Himalayas—River Valleys. *J. Manchester G. S.* **9** (1893): 112–125. **Oldham.**

The River Valleys of the Himalayas. By Mr. R. D. Oldham.

India—Mysore. **Elliot.**

Gold, Sport, and Coffee-planting in Mysore, with chapters on Coffee-planting in Coorg, the Mysore Representative Assembly, the Indian Congress, Caste, and the Indian Silver Question. Being the 38 years' experiences of a Mysore Planter. By Robert H. Elliot. Westminster, A. Constable and Co., 1894. Size 8 × 5½, pp. xxx. and 480. *Map. Price* 7*s.* 6*d. Presented by the Publishers.*

This work takes the place of a new edition of the author's 'Experiences of a Planter in the Jungles of Mysore,' and incorporates some parts of that book with many additions. It forms an excellent practical summary of life and resources in Southern India.

India—Survey. **Thuillier.**

General Report on the Operations of the Survey of India Department administered under the Government of India during 1892-93. Prepared under the direction of Colonel H. R. Thuillier. Calcutta, 1894. Size 13 × 8½, pp. 120 and cii. *Maps and Plate. Price* 3 *rupees. Presented by the Secretary of State for India.*

Karakoram—Himalayas. **Conway.**

Climbing and Exploration in the Karakoram-Himalayas. By William Martin Conway. With three hundred Illustrations by A. D. McCormick, and a Map. London, T. Fisher Unwin, 1894. Size 10 × 7, pp. xxviii. and 709. *Price* 31*s.* 6*d. Presented by the Publisher.*

A special review of Mr. Conway's work will appear in an early number.

Malay Peninsula. **Dennys.**

A Descriptive Dictionary of British Malaya. By N. B. Dennys, PH.D. London, "London and China Telegraph" Office, 1894. Size 10 × 7½, pp. vi. and [423]. *Price* 28*s. Presented by the Publisher.*

The dictionary treats of places, peoples, and products in a single alphabetic index; and the dictionary contains a great wealth of information on the most unlikely as well as on commonplace matters, arranged in a manner which makes reference very easy.

Palestine. **Smith.**

The Historical Geography of the Holy Land, especially in relation to the History of Israel and of the Early Church. By George Adam Smith, D.D. With six Maps. London, Hodder and Stoughton, 1894. Size 9¼ × 6¼, pp. xxiv. and 692. *Price* 15*s*. *Presented by the Publishers.*

This important contribution to historical geography will receive special notice.

Persia—Telegraphs. *J. S. Arts* **42** (1894): 534–546. **Wells.**

Telegraphs and Trade Routes in Persia. By Lieut.-Col. Henry L. Wells, R.E. *With Map.*

Philippine Islands. *B.S.G. Madrid* **36** (1894): 129–153. **Aguilar.**

Estado actual y porvenir del Archipiélago Filipino. Conferencia dada el 20 de Marzo de 1894 por D. José Nieto Aguilar.

Russia—Transcaucasia. *Globus* **65** (1894): 301–303. **Belck.**

Die Niveau-Schwankungen des Goektschai-Sees. Von Dr. Waldemar Belck.

Lake Gokcha in Erivan is compared as regards the fluctuations of its water-levels with the other lakes of the Armenian plateau recently discussed by Dr. Sieger (see vol. iii. p. 332).

Russia—Transcaucasia. *Deutsche Rundschau G.* **16** (1894): 363–368. **Grevé.**

Der Kreis Lenkoran nach eigener Anschauung geschildert von Karl Grevé in Moskau.

This short account of the Lenkoran district, bordering Persia in the south-west corner of the Caspian Sea, is illustrated by a map.

Tibet. **Bower.**

Diary of a journey across Tibet. By Captain Hamilton Bower. London, Rivington, Percival & Co., 1894. Size 9 × 6, pp. xvi. and 309. *Map and illustrations. Price* 16*s*. *Presented by the Publishers.*

Captain Bower's paper recently published in this *Journal* summarized the expedition which is here expanded and illustrated in a manner worthy of its great importance.

Turkey in Asia. **Cuinet.**

La Turquie d'Asie. Géographie administrative, statistique, descriptive et raisonnée de chaque Province de l'Asie-Mineure. Par Vital Cuinet. Tome Troisième. Fascicule 9. Paris, E. Leroux, 1894. Size 11 × 7½.

The present number completes vol. iii. of the work. It continues and completes the description of the Vilayet of Smyrna, and also describes the Mutessariflik of Bigha (Dardanelles), with a map.

AFRICA.

Abyssinia—Tigré Region. *B.S.G. Italiana* (1894): 162–174. **Gentile.**

Un' escursione nel Co-Hàin. Estratto dagli appunti di viaggio del cap. cav. Niccolò Gentile. *With map of route.*

African Peoples. **Préville.**

A. de Préville. Les Sociétés Africaines, leur origine, leur évolution, leur avenir. Paris, Firmin-Didot & Co., 1894. Size 8½ × 5½, pp. xix. and 345. *Maps. Price* 3*s*.

An interesting study of the populations of Africa, treating their genetic relationships and the interaction of environment and race.

Congo Plants. *B.S.R. Belge G.* **18** (1894): 5–33, 97–127. **Dewèvre.**

A. Dewèvre. Les Plantes utiles du Congo.

A full catalogue of the useful plants at present grown or found naturally in the Congo State, arranged systematically according to their valuable product.

Distribution of Ostrich. *B.S.G. Paris* **14** (1893): 399–416. **Forest.**

L'Habitat de l'Autruche en Afrique. Par Jules Forest.

A sketch-map shows the distribution of the Ostrich in southern and northern Africa, indicating in a general way the limits of range.

East Africa—Jub. *Petermanns M.* **40** (1894): 97–100. *Map.* **Fritzsche**

Die Lösung des Djuba-Problems. Neueste italienische Forschungen in den Galla-Somal-Grenzländern. Von G. E. Fritzsche.

This paper forms the subject of a special notice.

German East Africa. **Baumann.**

Durch Massailand zur Nilquelle. Reisen und Forschungen der Massai-Expedition des deutschen Antisklaverei-Komite in den Jahren, 1891–1893. Von Dr. Oscar Baumann. Berlin, Dietrich Reimer, 1894. Size 11 × 7½, pp. xvi. and 386. *Maps and Illustrations. Price* 14*s. Presented by the Publishers.*

This magnificent work contains a map of East Africa on the scale of 1 : 1,500,000, 27 separate plates, finely reproduced from photographs, and 140 illustrations in the text. It will be separately reviewed.

Morocco. **Montbard.**

G. Montbard. Among the Moors. Sketches of Oriental Life. London, Sampson Low & Co., 1894. Size 10 × 7, pp. xxii. and 281. *Illustrations. Price* 16*s. Presented by the Publishers.*

A profusely illustrated and perfervidly worded description of a run through Morocco.

North Africa. *C.R.S.G. Paris*, 1894: 144–147. **Monteil.**

Positions déterminées astronomiquement par le commandant Monteil pendant son voyage du Sénégal à Tripoli par le lac Tchad (1890–92).

List of 117 positions fixed by astronomical observations for latitude (except in a few instances where the latitude is estimated by dead-reckoning) and by chronometer and hour-angle longitudes checked by occasional lunar distances. The observations have been recalculated by M. de Villedeuil of the French Survey, and the probable error assigned is ± 1′ for latitudes and ± 0ᵐ 30ˢ (*i.e.* 7′ 30″) for longitude.

Obok and Abyssinia. *Rev. Maritime et Colon.* **121** (1894): 59, 295. **Alvarez.**

Obock et Abyssinie. Par M. Alvarez.

Tenerife. *Deutsche G. Blätter* **17** (1894): 1–42. **Krause.**

Tenerife. Reiseskizzen aus dem Jahre 1893. Von Dr. Aurel Krause. *With map.*

Dr. Krause travelled round the low ground of the island of Tenerife, and crossed the centre of it from north to south to the east of the Peak.

AUSTRALASIA.

Australia. **Boothby.**

On the Wallaby, or through the East and across Australia. By Guy Boothby. Illustrated by Ben. Boothby. London, Longmans & Co., 1894. Size 9 × 6, pp. xviii. and 344. *Price* 18*s. Presented by the Publishers.*

Mr. Boothby travelled across Australia from north to south, and here gives the impressions of his journey in a very popular style. The illustrations are excellent.

Gilbert Islands. *Globus* **65** (1894): 265–277. **Finsch.**

Hautverzierungen der Gilbert-Insulaner. Von Dr. O. Finsch. Delmehorst. Mit. 48 Originalskizzen.

An elaborate description of the tattooing of the Gilbert Islanders, with specimens of various designs. The method of tattooing is described, and the instruments used are figured.

South Australia. **Chewings.**

Beiträge zur Kenntnis der Geologie Süd und Central-Australiens, nebst einer Uebersicht des Lake Eyre Beckens und seiner Randgebirge. Inaugural-Dissertation zur Erlangung der Doktorwürde einer hohen naturwissenschaftlich-mathematischen Fakultät der Ruprechts-Karls-Universität zu Heidelberg, vorgebyt von Charles Chewings aus Süd-Australien, Heidelberg, J. Hörning, 1894. Size 9 × 6, pp. 42. *Presented by the Author.*

This thesis treats of the stratigraphical geology of South Australia.

MATHEMATICAL AND PHYSICAL GEOGRAPHY.

Atmospheric Erosion. *J. of Geology* **2** (1894): 318–331. **Udden.**

Erosion, Transportation, and Sedimentation performed by the Atmosphere. By J. A. Udden.

This is one of the admirable "Studies for Students" which form a prominent feature of this well-conducted Chicago magazine.

Atmospheric Refraction. *P.R.S.* **55** (1894): 217, 218. **Walker.**

Terrestrial Refraction in the Western Himalayan Mountains. By General J. T. Walker.

In this note General Walker shows that the difference of the coefficient of refraction on the northern and southern sides of the Himalaya points to some difference in the composition of the atmosphere, possibly the greater proportion of aqueous vapour on the southern side. The coefficient of refraction, varying with height, attains a minimum value at the altitude of 20,000 feet on the north side and a maximum value at the same height on the south side.

Field Geology. **Penning and Jukes-Browne.**

A Text Book of Field Geology. By W. Henry Penning, F.G.S. With a section on Palæontology, by A. J. Jukes-Brown, B.A., etc. Second Edition. London, Baillière, Tindall & Cox, 1894. Size 7½ × 5, pp. x. and 325. *Illustrations. Price 7s. 6d. Presented by the Author.*

Geodesy. *U.S. Coast and Geodetic Surv. Rep.*, 1894, *Pt. II.*: 503–564. **Mendenhall.**

Determinations of Gravity with the new half-second pendulums of the Coast and Geodetic Survey at stations on the Pacific Coast, in Alaska, and at the base stations, Washington D.C., and Hoboken N.J. By T. C. Mendenhall, Superintendent.

The new form of gravity pendulum here described is stated to have given results of much greater accuracy than any heretofore in use for the differential determination of gravity.

Geodesy. *Atti R.A. Lincei* [ser. 5] **3** (1894): 230–238. **Pizzetti.**

Sulla espressione della gravita alla superficie del geoide, supposto ellissoidico. Nota del prof. Paolo Pizzetti.

A mathematical discussion of the action of gravity on the surface of the Earth, treated as an ellipsoid.

Geodesy. **Messerschmitt.**

Lotabweichungen in der Westschweiz. Im Auftrage bearbeitet von Dr. J. B. Messerschmitt. Zurich, Fäsi und Beer, 1894. Size 12 × 9, pp. 200.

This treatise on the gravitational deviation of the plumb-line in Western Switzerland forms Volume VI. of the publications on the Swiss Trigonometrical Survey published by the Swiss Geodetic Commission. It gives detailed figures of the astronomical observations made for determining deviation at various stations.

Glacial Periods. *T.R.S. Edinburgh* **37** (1893): 127–149. **Geikie.**

On the Glacial Succession in Europe. By Professor James Geikie. *With a Map.*

Professor Geikie brings forward geological confirmation of the astronomical theory of a glacial epoch as stated by the late Mr. Croll and Sir Robert Ball. The map shows the extent of maximum glaciation for Europe at two periods.

Magnetic Conditions. *P.R.S.* **55** (1894): 210–217. **Wylde.**

On the Relations of the Secular Variation of the Magnetic Declination and Inclination at London, Cape of Good Hope, St. Helena, and Ascension Island, as exhibited on the Magnetarium. By Henry Wylde.

Mr. Wylde is the inventor of an extremely ingenious and elaborate piece of apparatus, the Magnetarium, in which he produces on a geographical globe the same sequence of magnetic changes as that which has been proved for the actual surface of the Earth. This paper deals with deductions from the apparatus.

Meteorological Maps. **Russell.**

Pictorial Rain Maps. By H. C. Russell. [Read before the Royal Society of N.S. Wales, November 1, 1893.] Size 9 × 6, pp. 4. *Map.*

Meteorology. *National G. Mag.* **6** (1894): 35–62. **Harrington.**

Weather-Making, Ancient and Modern. Mark W. Harrington.

Meteorology—Anticyclones. **Russell.**

Moving Anticyclones in the Southern Hemisphere. By H. C. Russell. [From the *Quarterly Journal of the Royal Meteorological Society*, vol. xix., No. 85, January, 1893.] Size 10 × 6½. *Diagrams.*

Mountain ranges. *J. of Geology* **1** (1893): 542–573. **Le Conte.**

Theory of the origin of Mountain Ranges. By Joseph Le Conte.

A criticism of the chief modern theories of mountain formation, which concludes by the verdict that the old contractional theory of Earth-crumpling is more probably correct than Mr. Mellard Reade's Expansion theory, Mr. Dutton's Isostatic theory, or Professor Reyer's Gliding theory. The last-named theory was briefly described in the *Proceedings*, vol. 14 (1892), p. 630.

Oceanography. ———

Berichte der Commission für Erforschung des östlichen Mittelmeeres. Zweite Reihe. Aus den Denkschriften der kais. Akademie der Wissenschaften in Wien. Band 60. Vienna, F. Tempsky, 1894. Size 12 × 9½, pp. 128. *Numerous Plates. Presented by the Vienna Academy of Sciences.*

This part contains four memoirs on the work done on board the *Pola;* two zoological by Dr. Emil v. Marenzeller, a chemical report on the cruise of 1892 by Dr. K. Natterer, and the physical results of the same cruise by Professor J. Luksch. The work done on the *Pola* has been repeatedly referred to in the *Journal.*

Oceanography. *U.S. Coast and Geodetic Surv. Rep.*, 1891, *Pt. II.*: 343–364. **Haskell.**

On observations of Currents with the Direction Current-meter in the Straits of Florida and in the Gulf of Mexico, 1891. A report by E. A. Haskell.

Appendix No. 10 to the Coast and Geodetic Survey Report for 1891, with illustrative plates.

Oceanography—Gulf of the Lion. *C.R.* **118** (1894): 203–206. **Pruvot.**

Sur les fonds sous-marins de la région de Banyuls et du cap du Creus. Note de M. G. Pruvot.

Account of the configuration of the sea-bed of the Gulf of the Lion, which is separated into two relatively shallow, gently sloping flats by a deep trough running up to meet the mountainous promontory of Cape Creus, the eastern termination of the Pyrenees. On pp. 172-176 M. de Lacaze-Duthiers describes the vessel belonging to the Banyuls marine station, and the equipments with which the work discussed by M. Pruvot was carried out.

Physical Geography. **Bonney.**

The Story of our Planet. By T. G. Bonney, D.SC. London, Cassell & Co., 1893. Size 9½ × 6½, pp. xvi. and 592. *Price* 31*s.* 6*d.* *Presented by the Publishers.*

Professor Bonney gives a vigorous defence of plain language as applied to the exposition of scientific results in his preface, and in his finely illustrated volume he imparts the first principles of geology and physical geography in an eminently scientific yet absolutely popular way. The work is divided into five parts—(1) "The Story, its books and their speech," a summary of general principles; (2) "The processes of sculpture and moulding;" (3) "Changes from within;" (4) "The story of past ages," a sketch of systematic geology; (5) "On some theoretical questions," those treated being, The age of the Earth, The permanence of ocean basins and land areas, Climatal change, and The distribution and the descent of life.

River Temperature. *Ann. d. Hydr.* **22** (1894): 1–6. **Bubendey.**

Die Temperatur des fliessenden Wassers zur Zeit der Eisbildung. Von Wasserbau-Inspektor J. F. Bubendey.

Route-surveying. *M. Forsch. Deutschen Schutzgebiet* **7** (1894): 1–14. **Baumann.**
Topographische Aufnahmen auf Reisen. Von Dr. Oscar Baumann.

Practical hints on route-surveying with the compass and plane-table, with diagrams illustrating the construction of a route-map.

Volcanic Craters. *Petermanns M.* **40** (1894): 82–85. **Sapper.**
Kratertypen in Mexiko und Guatemala. Von Dr. Carl Sapper.
Illustrated by maps of typical craters.

GENERAL.

Bibliography—Simony. **Forster.**
Verzeichniss der in Druck veröffentlichter Arbeiten von Friedrich Simony zu dessen 80 Geburtstage am 30 November, 1893. Zusammengestellt von A. E. Forster und herausgegeben vom Geographischen Institut der k. k. Universität Wien. Wien, 1893. Size 10½ × 7, pp. 16.

The first entry in this list of the published writings of the venerable Professor Simony is dated 1842, the last 1893, and both refer to the Dachstein region. Between these dates 167 memoirs are specified, dealing mainly with Alpine observations on peaks, glaciers, lakes, and climate.

Biographical Dictionary. **Lee.**
Dictionary of National Biography. Edited by Sidney Lee. Vol. xxxviii.: Milman—More. London, Smith, Elder & Co., 1894. Size 10 × 7, pp. vi. and 455.

This volume includes notices of the following names, more or less connected with geography and travel:—Francis Maximilian Misson, by Thomas Seccombe, Sir Thomas Livingstone Mitchell, by Major Leonard Darwin; Robert Moffat, by Colonel R. H. Vetch: Herman Moll, by Gordon Goodwin; Lieut.-General William Monteith, by the late H. M. Chichester; Colonel Thomas George Montgomerie, by Colonel R. H. Vetch; William Moorcroft, by H. M. Chichester; Francis Moore and Robert Morden, by Gordon Goodwin.

Biography—Günther. *Deutsche Rundschau G.* **16** (1894): 276–278. **[Umlauft].**
Professor Dr. Siegmund Günther. *With portrait.*

Biography—Monaco. *Deutsche Rundschau G.* **16** (1894): 227–230. **Paulitschke.**
Albert I. Fürst von Monaco, von Ph. Paulitschke. (*Portrait.*)

Biography—Reclus. *Globus* **65** (1894): 121–123. **Wolkenhauer.**
Elisée Reclus. Von Dr. W. Wolkenhauer. (*With Portrait.*)

Biography—Reiss. *Deutsche Rundschau G.* **16** (1894): 326–328. ———
Dr. Wilhelm Reiss. *With portrait.*

Biography—Ruge. *Deutsche Rundschau G.* **16** (1894): 374–376. ———
Professor Dr. Sophus Ruge. *With portraits.*

Biography—Segato. **Wolynski.**
B.S.G. Italiana **5** (1892): 437; **6** (1893): 51, 238, 753, 888, 995.
Girolamo Segato, Viaggiatore, Cartografo e Chimico. Ricerche biografiche e geografiche del dott. Arturo Wolynski con documenti inediti.

Segato was one of the most remarkable African travellers of the early part of the century, whose maps of the Upper Nile and the adjacent desert were of great value. The documents, now published for the first time, include many family letters written from Africa.

Biography—Wolf. **Weilemann.**
Vierteljahrsschrift Naturforsch. Ges. Zürich. **39** (1894): 1–64.
Nekrolog auf Prof. Dr. Joh. Rudolf Wolf. Von Prof. A. Weilemann.

This important biography is illustrated by a portrait, and contains a complete bibliography of Professor Wolf's writings. A biography and portrait also appear in the *Deutsche Rundschau für Geographie*, vol. xvi. (1894), p. 279.

British Army. **Goodenough and Dalton.**
The Army Book for the British Empire. A record of the development and present composition of the military forces and their duties in peace

and war. By Lieut.-General W. H. Goodenough and Lieut.-Colonel J. C. Dalton, aided by various contributors. London (for H.M. Stationery Office), Eyre and Spottiswoode, 1893. Size 9×6, pp. xxii. and 612. *Maps. Price 5s. Presented by Colonel Dalton.*

Although the general purpose and contents of this book are outside the usually accepted limits of geography, it contains two maps which are not readily accessible elsewhere. One of these shows the military districts of the United Kingdom with their respective head-quarters, and the other gives the Indian and colonial military posts and the chief naval coaling-stations.

British Association Report.

Report of the Sixty-Third Meeting of the British Association for the Advancement of Science, held at Nottingham, in September, 1893. London, John Murray, 1894. Size 9 × 6, pp. civ., 935, and 118, charts. *Presented by the Association.*

British Empire. *Scottish G. Mag.* **10** (1894): 225–242. **Parkin.**

The Geographical Unity of the British Empire. By George R. Parkin.

Mr. Parkin seeks to prove that the title of his paper is no paradox, by tracing the historical expansion of the empire, and showing how each accession had its own place in an organic whole, to which each part was essential, supplying a want that no other could touch.

British Empire. **Wilkinson.**

The Great Alternative, a Plea for a National Policy. By Spenser Wilkinson. London, Sonnenschien & Co., 1894. Size 8½ × 6, pp. 331. *Price 7s. 6d. Presented by the Publishers.*

The "alternative" proposed involves the question, "Will the British Empire stand or fall?" The question is, of course, purely political, but in so far as many of the conditions have a geographical basis, the work has a certain geographical value.

Commercial Geography—Seaports. **Dorn, etc.**

Die Seehäfen des Weltverkehrs dargestellt von Josef Ritter von Lehnert, Johann Holeczek, Dr. Karl Zehden, Dr. Theodor Cicalek, Ernst Becher, Rodolf Pajer, Adolf Schwarz, unter Redaction von Alexander Dorn. Two vols. I. Häfen Europas sowie der asiatischen und afrikanischen Küsten des Mittelmeerbeckens, pp. xii. and 1100, with 98 illustrations and 137 plans. II. (additional authors—R. Müller, F. R. Müller von Elblein, E. Edlen von Friedenfels, and Alfred Freiherr von Koudelka) Häfen ausserhalb Europas und des Mittelmeerbeckens. Pp. viii. and 828, with 75 illustrations and 79 plans. Vienna, Alexander Dorn, 1891, 1892. *Price*, vol. i., 23s.; vol. ii., 19s.

Discovery—Cousin. *B. S. G. Madrid*, **36** (1894): 84–93. **Duro.**

Juan Cousin, verdadero descubridor de América, según el capitán inglés Gambier, R.N., por D. Cesáreo Fernández Duro.

A review of Captain Gambier's paper in the *Fortnightly Review* of January, 1894.

Discovery of America. **Nocentini.**

La Scoperta dell' America, attribuita ai Cinesi. Relazione di Lodovico Nocentini. (Extract from Proceedings of the Genoa Geographical Congress.) Size 10½ × 6½, pp. 12. *Presented by the Author.*

A disquisition on the supposed Chinese discovery of America.

Druids. **Bonwick.**

Irish Druids and Old Irish Religions. By James Bonwick. London, [Sampson Low & Co.], 1894. Size 7½ × 5½, pp. viii. and 328. *Price 6s.*

In a lengthened course of general reading, Mr. Bonwick has collected a great deal of information relating to the ancient Druids and to the early religions of the Irish race, which he has embodied in the present volume. His book, to a large extent, consists of a collection of quotations from various writers, and is mainly of historical interest.

Educational. *Verh. X. Deutschen G.-tages* (1893): 116–126. **Neumann.**

Die Geographie als Gegenstand des akademischen Unterrichts. Von Prof. Dr. L. Neumann.

On Geography as a University subject.

Educational. *Verh. X. Deutschen G.-tages* (1893): 127-133. **Kirchhoff.**

Uber die Vorbereitung der Geographielehrer für ihren Beruf. Von Prof. Dr. A. Kirchhoff.

Educational. **Lyde.**

A Commercial Geography of the British Empire. By Lionel W. Lyde, M.A. London, Methuen & Co., 1894. Size 7½ × 5, pp. x. and 156. *Price 2s. Presented by the Publishers.*

Any attempt to treat the Commercial Geography of the British Empire on so microscopic a scale must be deemed extremely successful if it escape utter failure. Mr. Lyde has planned his work well, and executed it fairly. Such mistakes as the following should have been detected and removed in revision. Mentioning nitrogen and oxygen as "compounds," describing vapour as composed of "two elements—liquid which falls and heat which rises," the sentence, "Australia has *no* mountains of any really serviceable height!" the statement that the regularity of the north-west anti-trades in the South Atlantic is "due probably to the existence of active volcanoes on high land within the Antarctic circle," the repetition of the error that the sheltered west coast of the mainland of Scotland is "much more broken than the eastern owing to its being exposed to the force of the Atlantic waves and winds," treating Burma as a separate country from India, and referring to "the *nominal* equator." There is a tendency throughout to hasty generalization and a general disregard of the true difficulties besetting such a subject.

Geography—General. **Scobel.**

Geographisches Handbuch zu Andrees Handatlas mit besonderer Berücksichtigung der politischen, kommerziellen und statistischen Verhältnisse. Unter Mitwirkung von A. v. Danckelman, H. Gebauer, E. Jung, F. v. Juraschek, O. Krümmel, Ph. Paulitschke, W. Petzold, H. Polakowsky, J. Rein, S. Ruge herausgegeben von A. Scobel. Bielefeld and Leipzig, Velhagen and Klasing, 1894. Size 9½ × 6½, pp. viii. and 687. *Presented by the Publishers.*

This companion to Andree's Handatlas is really an extremely compact and well-balanced treatise on geography.

Historical. **Collingridge.**

The Fantastic Islands of the Indian Ocean and of Australasia in the Middle Ages, and their significance in connection with the early Cartography of Australia. By George Collingridge. [No place or date of publication] (1893?). Size 10½ × 6, pp. 14. *Presented by the Author.*

Ice-destruction. *R. maritime et Coloniale* **121** (1894): 18-48. **Dibos.**

Note sur les Travaux de Déglaçage dans les estuaires fluviaux et maritime. Par Maurice Dibos.

This paper will be the subject of a special note.

Maps. *U.S. Coast and Geodetic Surv. Rep.*, 1891, *Pt. II.*, 565-746. ———

Proceedings of the Topographical Conference held at Washington, D.C., January 18 to March 7, 1892.

This Conference of the officials of the American Surveys deals with a number of important questions bearing on surveying and mapping, including the discussion of instruments and methods, the comparison of European and American surveys, and a great deal of miscellaneous information and expressions of opinion from different surveyors on the points discussed.

Mountaineering. **Coolidge.**

Was ist eine "Erste Besteigung"? Von Rev. W. A. B. Coolidge. Separat-Abdruck aus Nr. 375, vom 26, Mai 1893 der "Oesterr, Alpen-Zeitung." Size 10½ × 7½, pp. 6. *Presented by the Author.*

Oriental Literature. **Müller.**

The Sacred Books of the East . . . edited by F. Max Müller. Vol. XLI. Oxford, the Clarendon Press, 1894. Size 9 × 6, pp. xxvii. and 424. *Presented by the Secretary of State for India.*

World-divisions. *Verh. X. Deutschen G.-tages* (1893): 188-198. **Hettner.**

Über den Begriff der Erdteile und seine geographische Bedeutung. Von Dr. Alfred Hettner.

Yachting.

Yachting. [Vol. I.] By Sir Edward Sullivan, Bart., Lord Brassey, C. E. Seth-Smith, G. L. Watson, R. T. Pritchett, Sir George Leach, the Earl of Pembroke and Montgomery, E. F. Knight, and Rev. G. L. Blake. [Vol. II.] By R. T. Pritchett, the Marquis of Dufferin and Ava, James McFerran, Rev. G. L. Blake, T. B. Middleton, Edward Walter Castle and Robert Castle, G. Christopher Davies, Lewis Herreshoff, the Earl of Onslow, H. Horn, Sir George Leach. London, Longmans & Co., 1894. Size 8 × 5½, pp. (vol. i.) xvi. and 439; (vol. ii.) xvi. and 456. *Illustrations. Price* 10*s.* 6*d. each vol. Presented by the Publishers.*

The most geographical of all sports is well treated from most standpoints in these volumes. We miss, however, such a chapter on yachting for scientific purposes as the Prince of Monaco might have written.

NEW MAPS.

By J. Coles, *Map Curator*, R.G.S.

EUROPE.

Alps. **Deutschen u. Oesterreichischen Alpen-Verein.**

Oetzthal and Stubai. Scale 1 : 50,000 or 1·2 stat. miles to an inch. Blatt IV., S. Weisskugel. Herausgegeben v. Deutschen u. Oesterreichischen Alpen-Verein. 1893. Stich u. Druck v. Giesecke & Devrient, Leipzig u. Berlin. *Presented by the Deutschen u. Oesterreichischen Alpen-Verein.*

This map is based on the surveys of the Austrian Military Geographical Institute The topographical features are shown by a combination of contours and shading, and numerous heights are given in metres. The contours on glaciers are given in blue, all others being coloured brown. The lettering is clear, and the whole effect is very pleasing and satisfactory.

England and Wales. **Wells.**

Map of Canals and Navigable Rivers of England and Wales. By Lionel B. Wells, M.I.C.E., late engineer to the River Weaver Navigation. Scale 1 : 1,130,000 or 15·5 stat. miles to an inch. S. Falkner & Sons, London. *Price* 3*s.*

In this map Mr. Wells shows the present state of the inland navigation of England and Wales. Independent navigable rivers and canals are indicated by blue lines, the railway-owned navigation by red, and abandoned canals by broken lines. The capacity of each river or canal, with regard to navigation, is clearly indicated, and at the foot of the map a large amount of information is given in tabular form.

England and Wales. **Ordnance Survey.**

Publications issued since May 8, 1894.

1-inch :—

England and Wales :—132, 242, with hills photozincographed in brown, 1*s.* each.

Special map of Nottingham and its environs, 1*s.* 6*d.*

6-inch—County Maps :—

England and Wales :—**Lancashire,** 117 N.E., 99 N.E. **Yorkshire,** 91 S.E., 205 N.E., 218 S.E., 235 S.W., 248 S.E., 249 N.W., N.E., 264 S.E., 272 S.E., 274 N.W., 294 N.W., 298 N.W., 299 S.E., 1*s.* each.

25-inch—Parish Maps :—

England and Wales :—**Lancashire,** LXIX. 14, 8*s.*; 15, 5*s.*; 16, 5*s.*; LXXV. 9, 8*s.*; 10, 14*s.*; LXXVI. 2, 5*s.*; LXXVII. 10, 4*s.*; 11, 5*s.*; 16, 4*s.*; LXXXIX. 7, 5*s.*; 8, 4*s.*; XCIII. 7, 8*s.*; XCVII. 12, 5*s.*; 16, 8*s.*; CI. 10, 4*s.*; 13, 11*s.* 6*d.*; CVII. 4, 8*s.*; CVIII. 1, 11*s.* 6*d.*; CXI. 2, 5*s.* (coloured). **Yorkshire,** XXXII. 6, 4*s.*; XLI. 1, 2, 5, 6, 9, 13, 14, 4*s.* each; LXIV. 4, 4*s.*; 5, 3*s.*; 13, 15, 16, 4*s.* each; CXV. 2, 3, 12, 4*s.* each.; CLXVII. 14, 4*s.*; CCXV. 4, 5*s.*; 7, 9, 10, 13, 14, 4*s.* each; 16, 5*s.*; CCXXIX. 11, 8*s.*; CCXXX. 1, 8*s.*; 14, 4*s.*; CCXXXI. 5, 14*s.*; CCXXXIII. 2, 4*s.*; CCXLIV. 1, 5*s.*; 2, 4*s.*; 6, 3*s.*; 7, 4*s.*; CCXCIII. 2, 3*s.*; 3, 4*s.* (coloured).

Town Plans—5-feet scale :—

Ashton-under-Lyne and Stalybridge (Revision), X., XIII., 2*s.* 6*d.* each.

Town Plans—10-feet scale :—

Middlesborough, VI. **10**, 2, 3, 7, 14, 16, 17, 18, 19, 20, 22, 25; VI. 14, 1, 3, 6, 9.

Plymouth and Environs, CXXIII. **8**, 22; CXXIII. **12**, 14, with houses stippled, 2*s.* 6*d.* each.

(*E. Stanford, Agent.*)

Sweden. **Generalstabens topografiska afdelning, Stockholm.**

Generalstabens karta öfver Sverige. Scale 1 : 100,000 or 1·5 stat. miles to an inch. Sheets: 80, Uddeholm; 81, Filipstad.—Karta öfver Norbottens Län. Scale 1: 200,000 or 3·1 stat. miles to an inch. Sheets: 26, Löfmokk; 27, Arjepluog; 28, Stenträsk; 29, Harads; 30, Öfver Kalix; 35, Arvidsjaur. Generalstabens topografiska afdelning, Stockholm.
Presented by Topographical Section of the Swedish General Staff.

ASIA.

Indian Government Surveys.

Indian Atlas, 4 miles to an inch. Sheets: No. 104, Parts of Districts Mirzapur (N.W. Provinces), Shahabad, Gaya, etc. (Bengal), with additions to 1892. No. 113, Parts of Districts Birbhum, Burdwan, etc. (Bengal), with additions to 1893. Quarter sheets: No. 67, S.E. Parts of Districts Bareilli, Pilibhit and Shahjahanpur (N.W. Provinces), and Kheri (Oudh), with additions to 1892. No. 103, N.W. Parts of Districts Darrang, Sibsagar, Nowgong, Lakhimpur, Naga Hills (Assam), and Daphla Hills. Additions to 1890.—North-West Provinces and Oudh Survey, 1 inch to a mile. Sheets: Nos. 39A, 40, 41, 58A, 57, 58, 59, 77, 78, 79, 80 (Preliminary editions), District Jhansi. Seasons 1888-90. Sheet: No. 160, District Gonda and Bahraich. Seasons 1866-70.—Lower Burma Survey, 1 inch to a mile. No. 226, Parts of Districts Prome, Tharrawaddy, and Toungoo. Seasons 1886-91.—North-East Frontier, 1 inch to 4 miles. Sheet: No. 23, N.W. Parts of Districts Bhamo, Upper Chindwin, and Katha (Upper Burma).—North-Eastern Frontier, 1 inch to 8 miles. Sheet: No. 15 (third edition), Parts of Districts Sylhet, Cachar, Naga Hills, Manipur, etc.—South-Eastern Frontier, 1 inch to 4 miles. Sheet: No. 4, N.E. (fifth edition), Part of Northern Shan States. Seasons 1887-93. No. 4, S.W. (seventh edition), Parts of Districts Ruby Mines, Shwebo, Saging, and Mandalay (Upper Burma), and of the Northern Shan States. Seasons 1886-93.—South-Eastern Frontier, 1 inch to 8 miles. Sheet No. 3 (second edition), Parts of Districts Minbu, Magwe, and Pyinmana (Upper Burma), and of Akyab, Kyaukpyu, Thayetmyo, Toungoo, etc. (Lower Burma), 1893. No. 7 (second edition), Parts of Districts Shewegyin, Amherst, Salween, Tharrawaddy, etc. (Lower Burma), and part of the Kingdom of Siam, 1893.—Map of Sind, 1 inch to 16 miles. Additions to Dec., 1892.—Skeleton Map of the Punjab and Surrounding Countries, 1874, 1 inch to 32 miles. Additions to 1892.—Route Map of the Western Himalayas, Kashmir, Punjab, and Northern India, with portions of Afghanistan, Baluchistan, etc. (including the former Kashmir Route Map), 1 inch to 32 miles, with additions to Railways, 1893, with a pamphlet.—Map of the North-West Provinces and Oudh in April, 1893, 1 inch to 32 miles. Accompaniment to the Annual Administration Report, N.W. P. and Oudh, P. W. D. B. and R. Branch for the year 1892-93.—Map of the Allahabad Division, prepared in accordance with Govt. N.W. P., P. W. Department. Circular No. "E.," dated May 16, 1872. Revised up to April 1, 1892.—The Province of Assam under the jurisdiction of the Chief Commissioner, with the adjacent hills. Scale 1 inch to 8 miles, in 9 sheets. Sheets Nos. 4 and 9.—District Hooghly, 4 miles to an inch. Additions to Nov., 1892.—District Sisapur, N.W. Provinces and Oudh. Scale 1 inch to 8 miles.—District Rae Bareli, N.W. Provinces and Oudh, 1 inch to 8 miles, 1893.—District Murshidabad, Bengal, 1 inch to 8 miles, 1893.—District Fatehpur, N.W. Provinces and Oudh, 8 miles to an inch, 1893.—District Cawnpore, N.W. Provinces and Oudh, 1 inch to 8 miles, 1893.—District Fizabad, N.W. Provinces and Oudh, 1 inch to 8 miles, 1893.—District Hardoi, N.W. Provinces and Oudh, 1 inch to 8 miles, 1893.

—District Faridpur, Bengal, 1 inch to 8 miles, 1893.—District Farukhabad, N.W. Provinces and Oudh, 1 inch to 8 miles, 1893.—District Bareilly, N.W. Provinces and Oudh, 1 inch to 8 miles, 1893.—District Bijnor, N.W. Provinces and Oudh, 1 inch to 8 miles, 1893.—District Budaun, N.W. Provinces and Oudh, 1 inch to 8 miles, 1893.—District Agra, N.W. Provinces and Oudh, 1 inch to 8 miles, 1893.—District Banda, N.W. Provinces and Oudh, 1 inch to 8 miles, 1893.—District Bara Banki, N.W. Provinces and Oudh, 1 inch to 8 miles, 1893.—Districts of Akola and Buldana, Hyderabad Assigned Districts, 1 inch to 8 miles, 1893.—Districts Amraoti and Ellichpur, Hyderabad Assigned Districts, 1 inch to 8 miles, 1893.—Districts Wun and Basim, Hyderabad Assigned States, 1 inch to 8 miles, 1893.—District Cachar, Assam, 1 inch to 8 miles, 1893.—District Goalpara, Assam, 1 inch to 8 miles, 1893.—District Sylhet, Assam, 1 inch to 8 miles, 1893.—Upper Burma, 16 miles to an inch, 1893. 2 sheets.—Indo-China (East of Longitude 96 E.), 1 inch to 32 miles. 2 sheets.—District Naga Hills, Assam, 4 miles to an inch. Second edition, 1893.—District Ruby Mines, Upper Burma, 4 miles to an inch, 1893.—Preliminary Chart of the principal Triangulation of the Mandalay Meridional Series, No. 4, Season 1892-93, 1 inch to 4 miles, 1893.—Chart of Triangulation Madras Forest Survey, Coimbatore District (Coimbatore Taluk). Season 1890-91. With a list of Latitudes, Longitudes, Heights, and Azimuths.—Chart of Triangulation Madras Forest Survey, Coimbatore District (Udamalpet and Pollachi Taluks). Seasons 1890-92. With a list of Latitudes, Longitudes, Heights, and Azimuths, 1893. *Presented by H.M. Secretary of State for India, through India Office.*

AFRICA.

Algeria. **Service Géographique de l'Armée, Paris.**

Carte topographique de l'Algérie. Scale 1:50,000, or 1·2 inch to a statute mile. Service Géographique de l'Armée, Paris. Sheets:—Nos. 60, Oued Damous; 69, Aïne Roua; 81, Warnier; 91, Bordj Boni; 96, Oued Athmenia; 98, Aïne Regada; 242, Mercher Lacombe. *Price 1 fr. 50 c. each sheet.*

Congo. **Pobéguin.**

Atlas des Côtes du Congo Français en vingt-deux feuilles à l'Echelle de 1:80,000 or 1·2 statute miles to an inch. Paris, 1893. Reconnaissance faite en suivant le Rivage par Henri Pobéguin, chef de Station, Février & Août, 1890, 25 Janv., 27 Juin, 1891. Carte dressée d'après les carnets et les Observations astronomiques antérieures.

This series consists of twenty-two maps, embracing the coast-line of the French possessions in the neighbourhood of the Congo from Campo to Massari. Though the information contained in these maps only extends for a short distance inland, many details are given that are not to be found elsewhere.

Egypt. **Egypt Exploration Fund.**

An Atlas of Ancient Egypt. With complete Index, Geographical and Historical Notes, Biblical References, etc. Special publication of the Egypt Exploration Fund. London: Kegan Paul, Trench & Co. B. Quaritch, Asher & Co., and Egypt Exploration Fund. 1894. *Price* 3*s.* 6*d.*

This atlas has been published by the Egypt Exploration Fund, to supply a want that has been greatly felt by students, of an atlas in which could be found the latest identifications of ancient sites, and the important geographical discoveries which have resulted from the work of the Fund in Egypt.

This atlas contains the following maps:—I., Ancient Egypt and Adjacent Countries; II., Modern Egypt and Adjacent Countries, with an inset showing the principal geological features; III. to V., Ancient Egypt from the Delta to Philæ; VI., VII., Ethiopia; VIII., Goshen and the probable route of the Exodus. The maps are furnished with notes of historical interest, and are accompanied by letterpress containing valuable and instructive information.

AUSTRALIA.

Queensland. **Jack, and others.**

Geological Map of Charters Towers Goldfield, Queensland. Geological Lines by R. L. Jack, W. H. Rands, and A. Gibb Maitland. Scale 4 chains to an inch. Topography, William Thompson, 1894. 6 sheets. *Presented by R. L. Jack, Esq., through Agent-General for Queensland.*

GENERAL.

Historical Geography. **Schrader.**

Atlas de Géographie Historique. Ouvrage contenant 54 Grandes Cartes doubles en couleurs, accompagnées d'un Texte Historique au dos et d'un grand nombre de cartes de Détail, Figures, Diagrammes, etc. Par une Réunion de Professeurs et de Savants, sous la direction géographique de F. Schrader. Directeur des travaux cartographiques de la librairie Hachette et C^ie^. Paris: Librairie Hachette et C^ie^. Part 7. *Price* 1 *fr.* 50 *c.* *Presented by the Publishers.*

Sheet 37 is a map showing the successive extensions of the Empire of Russia from the middle of the thirteenth century to the present day. Sheet 42 contains six maps of France, on which political, administrative, judicial, and ecclesiastical divisions are shown. Sheet 12 is a map illustrating the progress of Roman Conquests under the Empire. The notes which accompany the maps have been written by MM. A. Debidour, D. Aïtoff, and Paul Guiraud.

The World. **Vidal-Lablache.**

Atlas Vidal-Lablache, Maitre de Conférences de Géographie a l'École Normale Supérieure. Histoire et Géographie, 137 Cartes, 248 Cartons. Index Alphabétique de plus de 40,000 noms (L'Atlas complet paraîtra en 24 livraisons). 24^e^ livraison. Paris: Armand Colin et C^ie^., Editeurs. *Price* 1 *fr.* 25 *c. each part.*

The present issue, which contains maps of the south-east frontier of France, Cochin China, and French Cambodia, Indo-China, Tonkin, and the States of the Andes and River Plate, completes the atlas. In addition to these, a special sheet is given, containing specimens of cartography taken from maps, drawn on a large scale, together with the title-page and preface. The index, which will be issued as a supplement, will be supplied at the price of two francs. Taken as a whole, this is a very useful atlas, each map being accompanied by explanatory notes, which will be of great assistance to students.

The World. **Vivien de Saint-Martin & Schrader.**

Atlas Universel de Géographie construit d'après les sources originales et les documents les plus récents cartes, voyages, mémoires, travaux géodésiques, etc. Avec un Texte Analytique. Ouvrage commencé par M. Vivien de Saint-Martin et continué par Fr. Schrader. Sheet No. 78, Amérique du Sud, feuille Nord-Est. Paris: Librairie Hachette et C^ie^. *Presented by the Publishers.*

The several issues of this atlas have been published at uncertain intervals during the past thirteen years, and thus some of the earlier sheets do not represent the present state of our geographical knowledge. In this instance, the north-east sheet of a map of South America is given, and, like all the previous maps of this atlas, is an excellent specimen of cartography, which only makes it the more to be regretted that at the present rate of publication it will be several years before the atlas will be completed.

PHOTOGRAPHS.

Ooregum Gold Mines.

Album containing 20 photographs of the Ooregum Gold Mines, Mysore, India. *Presented by C. H. Wallroth, Esq.*

This is a very interesting set of views of the Ooregum Gold Mines, in the Kolar District, Mysore. The series consists of twenty excellent photographs, which have been placed in an album and presented to the Society by Mr. C. H. Wallroth, who has on previous occasions contributed largely to the Society's collection of photographs.

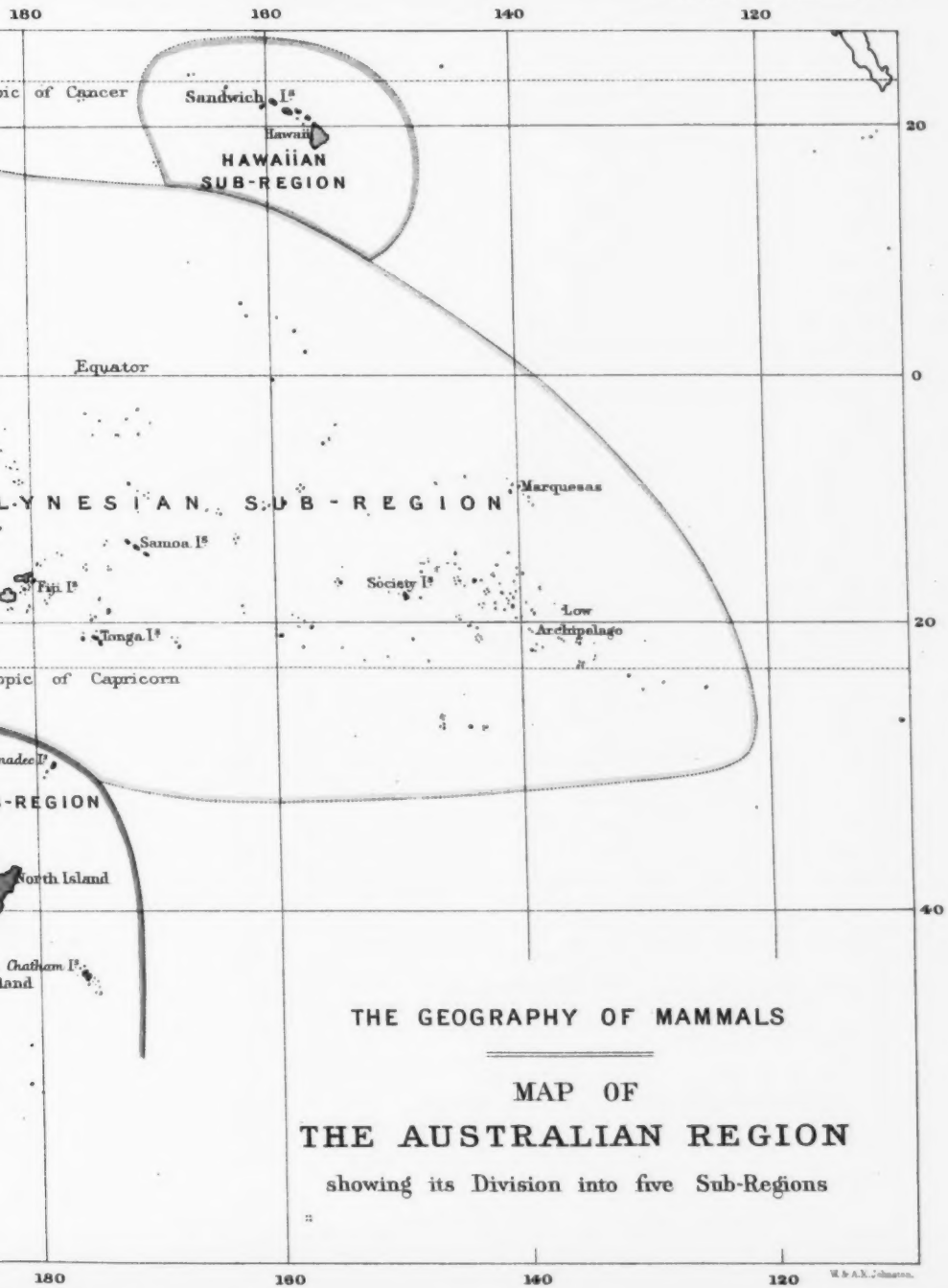
Uraguay. **Fitz Patrick.**

Twelve photographs of the Central Uruguay Railway, taken by Fitz Patrick, Rincon, 1894. *Presented by Leonard Cooper, Esq.*

These are views taken at different points on the Central Uruguay Railway, and illustrate the nature of the works and general features of the country through which it passes.

N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.

Published by the Roya

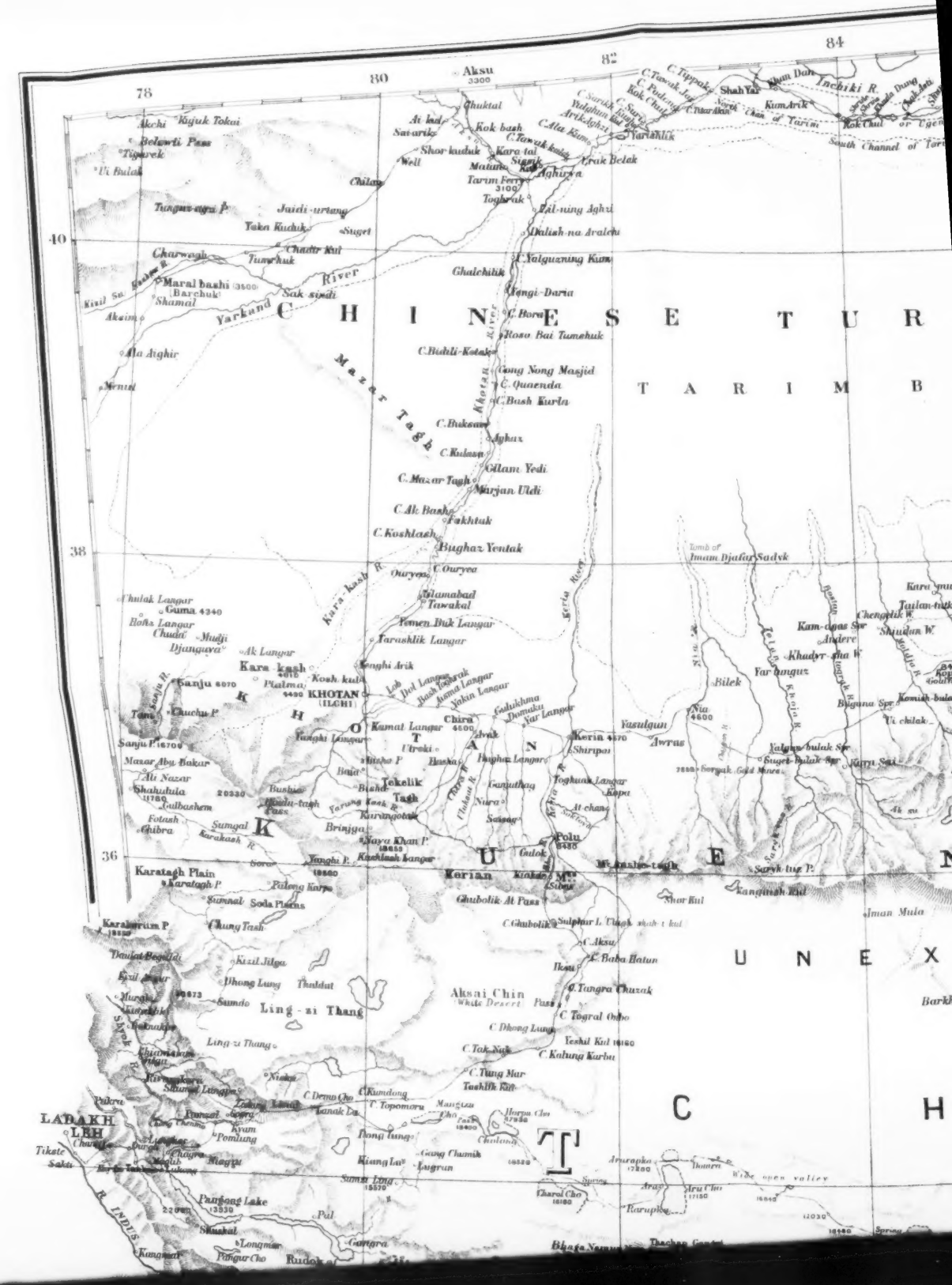


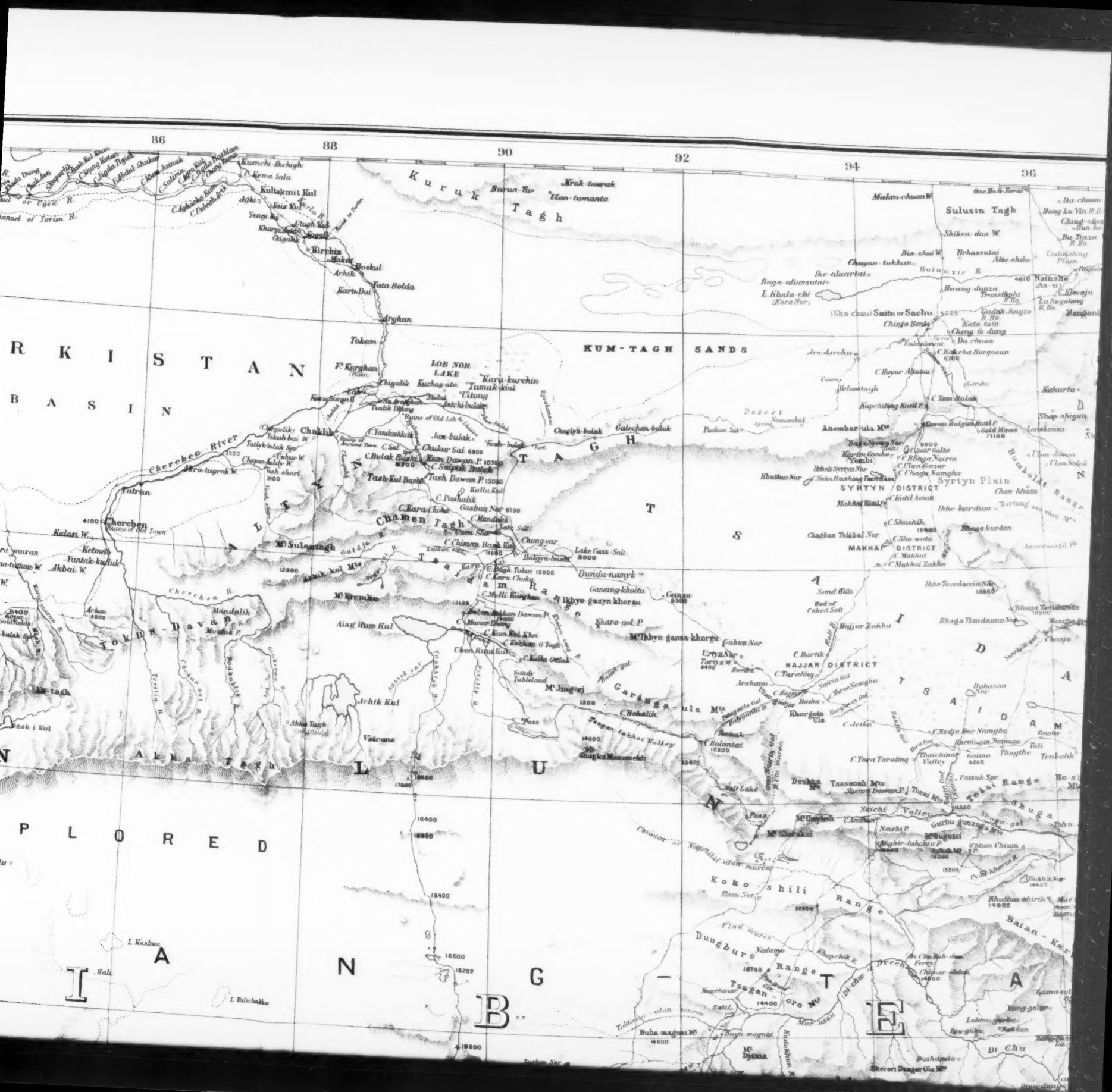
THE GEOGRAPHY OF MAMMALS

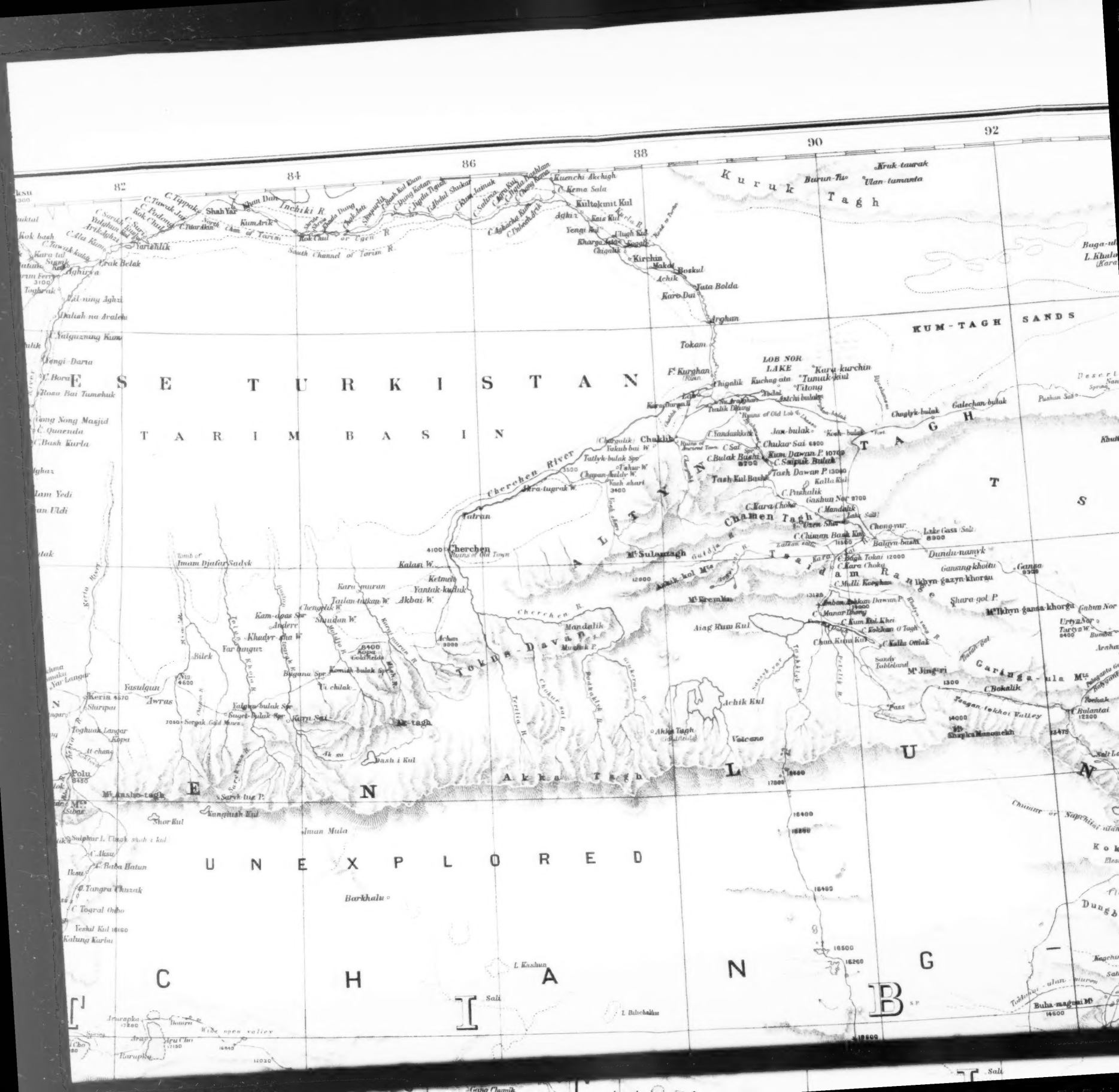
MAP OF
THE AUSTRALIAN REGION
showing its Division into five Sub-Regions

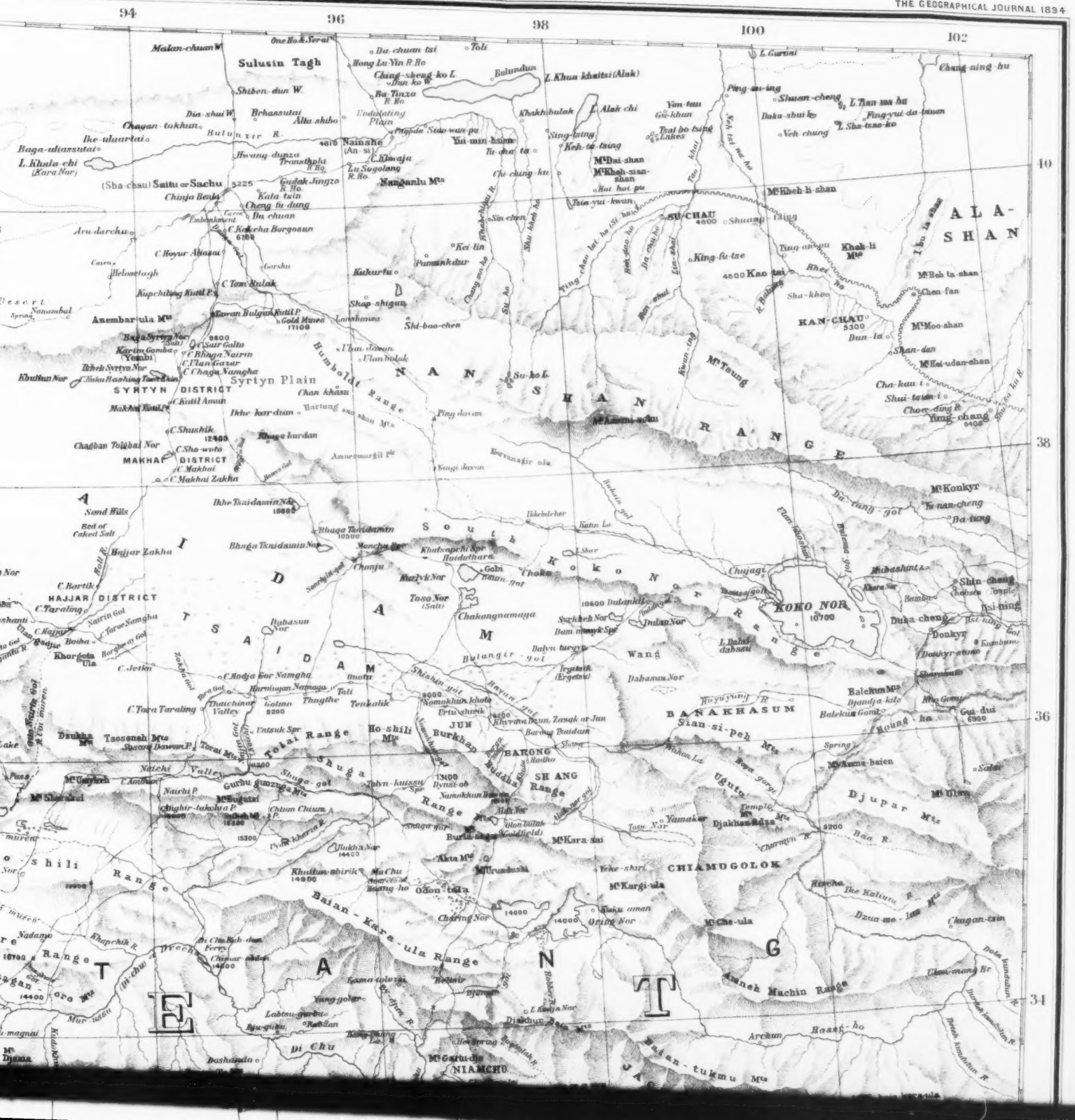
W. & A.K. Johnston.

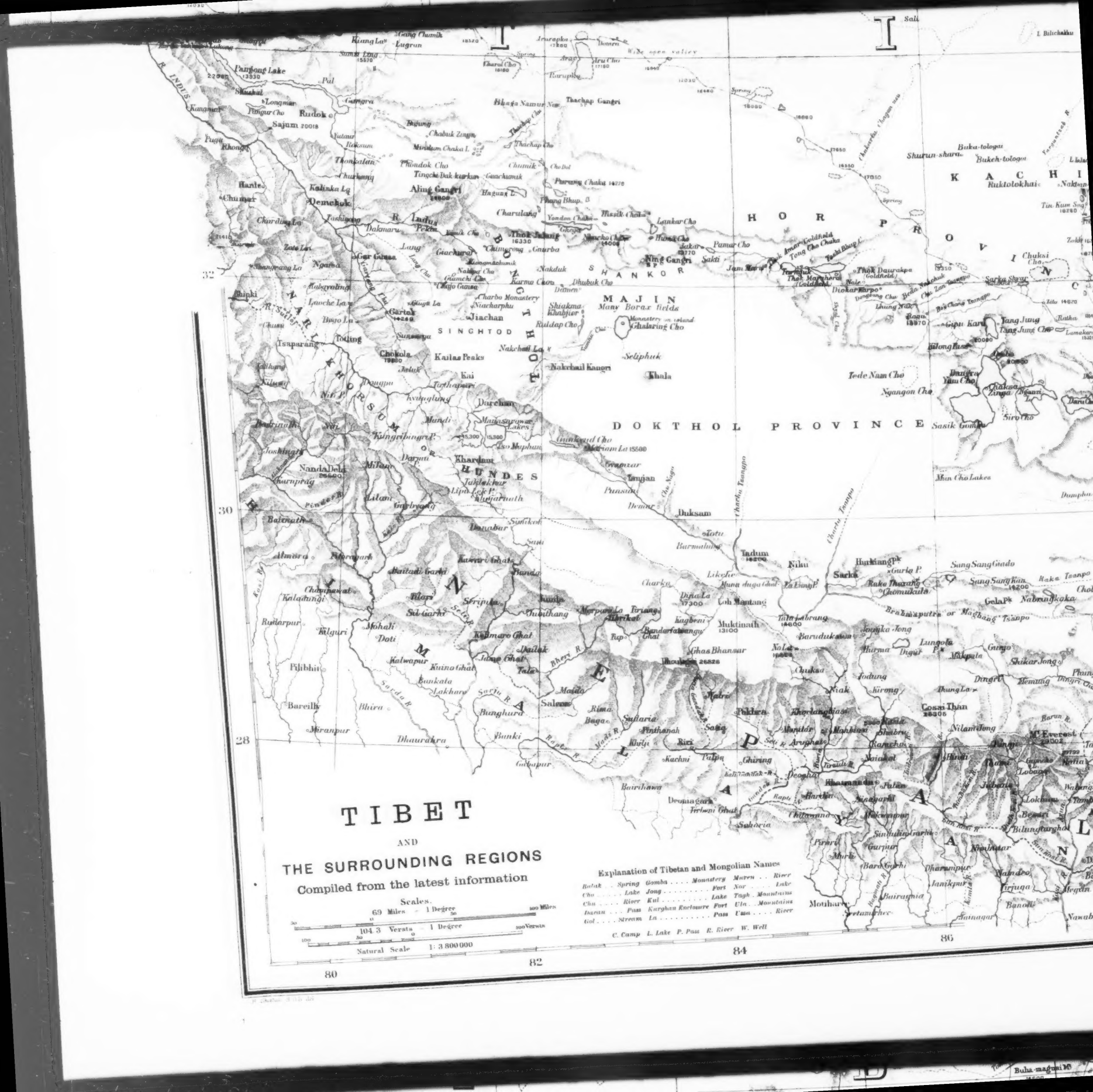
the Royal Geographical Society

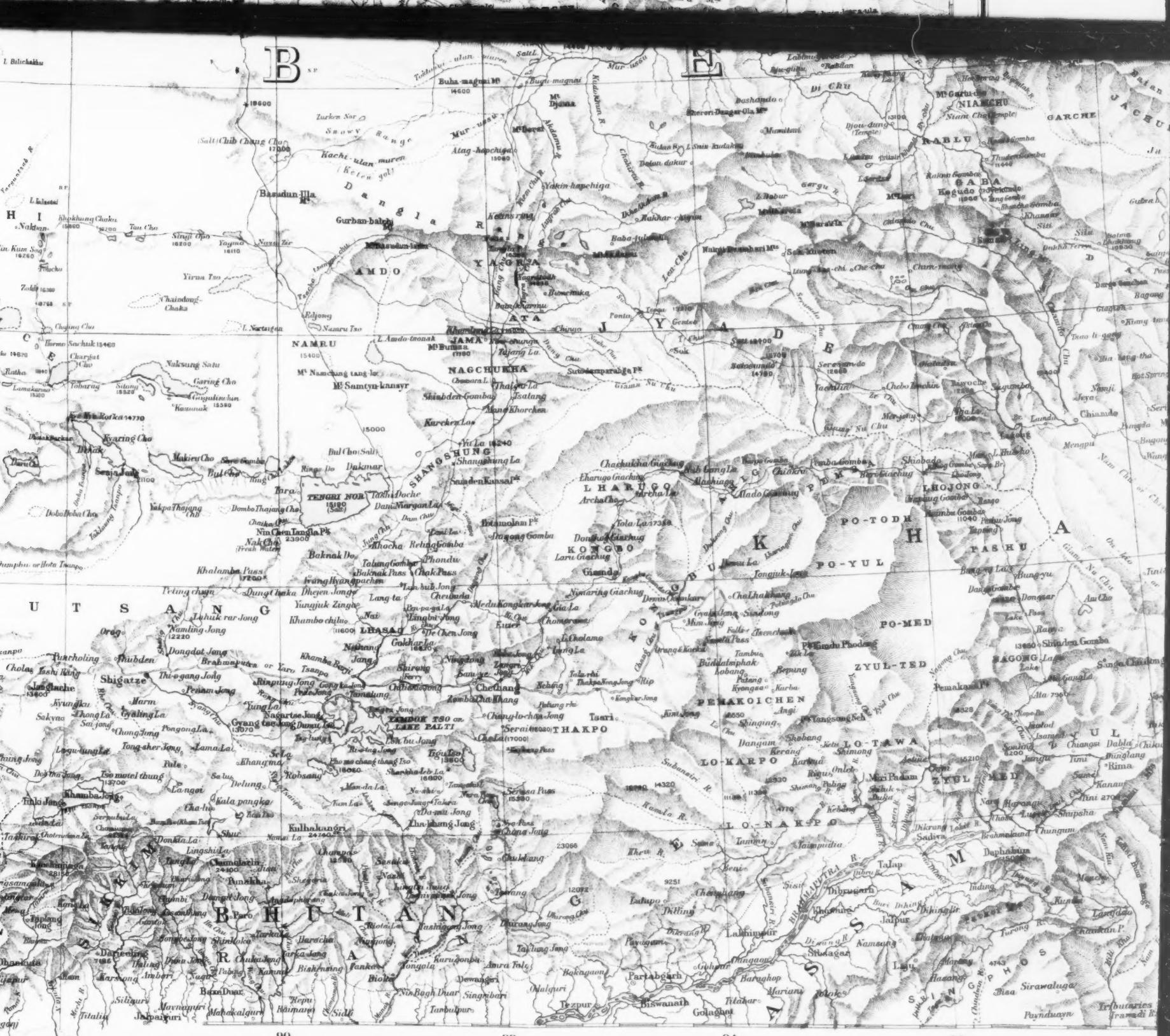

78
80
82
84
40
38
36
Aksu
3300
Yarkand River
Mazar Tagh
Kara-kash R.
Kara kash
KHOTAN
(ILCHI)
Tekelik Tagh
Karakoram Pass
Karakash R.
Karatagh Plain
Karakorum P.
Ling-zi Thang
Aksai Chin
White Desert
Pangong Lake
INDUS R.
LADAKH
LEH
Tikste
Saka
Yangi-Daria
Khotan R.
Keria River
Keria R.
Yurung Kash R.
Chira R.
Yasulgun
Keria
Awras
Bilek
Yar tanguz
Kara tal
Tarim Ferry
Togbrak
Aghiza
Chilan
Maral bashi
(Barchuk)
Shamal
Akim
Ala Aighir
Menut
Tumchuk
Charwegh
Tangus-agra P.
Jaidi-urtang
Yaka Kuduk
Sugrt
Chadir Kul
Kizil Su
Tiguvek
Ui Bulak
Akchi
Kujuk Tokai
Belowti Pass
Chuktal
Ai laid
Sai-arik
Kok bash
Shor-kuduk
Well
Matung
Sugrk
Aghiza
Irak Belak
Tarashlik
Artkeghri
Kum Arik
Shah Yar
Inchiki R.
Yalguzning Kum
Ghalchilik
Bosa Bai Tumshuk
Gang Nong Masjid
Gilam Yedi
Marjan Uldi
Bughaz Yentak
Ouryea
Tilamabad
Tawakal
Yemen Buk Langar
Tarashlik Langar
Ak Langar
Kosh kul
Dad Langar
Bash Tokrak
Juma Langar
Yakin Langar
Gulukma
Domaku
Yar Langar
Kamal Langar
Utreki
Yanghi Langar
Bisha
Baska
Bagha Langar
Ganjutbag
Toghuna Langar
Kapa
Nura
Sasang
Kirangotak
Brinjga
Maya Khan P.
Kashkash Langar
Gulok
Polu
Korian
Mt. Sakir
Ghubolik Mt Pass
Sulphur L.
Aksu
Baba Batun
Tangra Chuzak
Togral Oghu
Dhong Lung
Yeshil Kul
Tak Nak
Kahung Karbu
Tung Mar
Tashlik Kul
Kundong
Topomoru
Manguza
Thong Lung
Chulung
Kiung Lung
Lagrun
Gang Chamik
Sumai Lung
Pangong Lake
Pal
Gangra
Rudok
Pangur Cho
Longmar
Sumkal
Pamkar
Pomlung
Chaya
Marpu
Thaldut
Sumdo
Murgle
Kizil Jilga
Dhong Lung
Kizil Dawar
Dawlat Begdi
Karakorum P.
Karatagh P.
Patang Karpo
Sumnal
Soda Plains
Chung Tash
Yangi P.
Sarik tuz P.
Kangmish Kul
Iman Mula
Shor Kul
Sarik tuz
Kara tal
Togbrak
Tarim
South Channel of Tarim
Kok Chul or Ugen
Kum Arik
Tsaidam
Tsaidam Dung
Shah Yar
Tsaidam
Kok Chul
Tsaidam
Tsaidam
Tsaidam

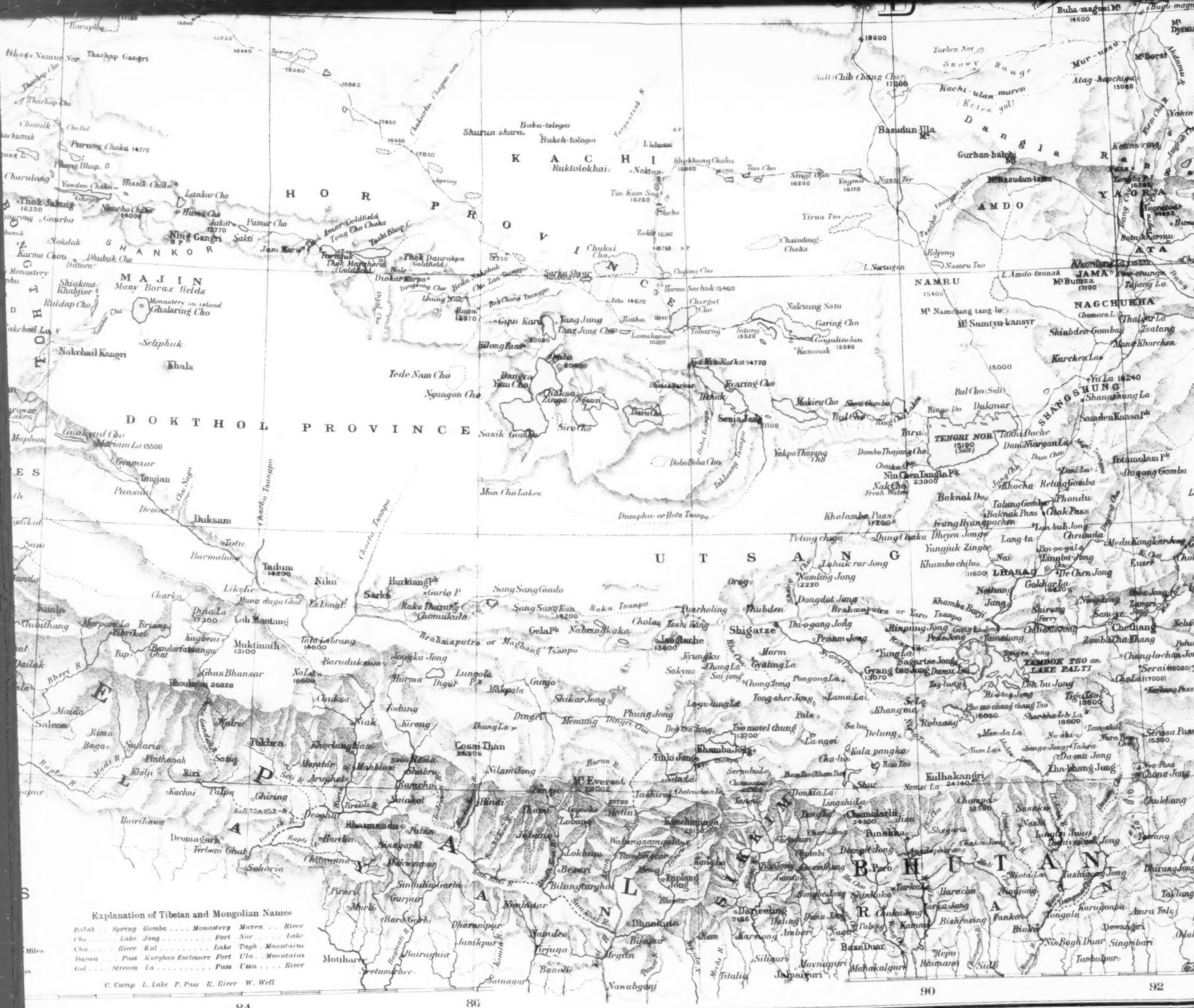

86
88
90
92
94
96
Kuruk Tagh
KUM-TAGH SANDS
LOB NOR LAKE
Kara-kurchin
Tumak-kul
Utong
Astchi-bulak
Kuchug-ata
Chigalik
Tokum
Kirchin
Bokul
Achik
Jata Bolda
Karo Dai
Arghan
Chakilik
Cherchen River
Jax-bulak
Chakur Sai
Kum Dawan P.
Tash Dawan P.
Tash Kul Bashi
Tatran
Cherchen
Kara Choko
Gashun Nor
Chaman Tagh
Mt Sulaxtagh
Chimen Bash Kul
Chong-yar
Lake Gasa Salt
Balgyn-bashi
Dundu-namyk
Ikhyn-gazyn-khorgu
Mt Ikhyn gansa khorgo
Gansa
Gahun Nor
Mt Jingeri
Garanga-tula Mts
Bokalik
Yangan-takhot Valley
Mt Shapka Mazenchh
Akka Tagh
Volcano
Achik Kul
Tokta-Davan P.
Aiag Kum Kul
Mandalik
Archan
Ak-tagh
Ketmen
Yantak-kuduk
Akbai W.
Kalan W.
Tatkan W.
Ak-kol Mts
Mt Bremdin
Kara-Tokai
Kum Kul Khri
Kalta Ottak
Sandy Tableland
Yangan-takhot Valley
Mt Shapka Mazenchh
Dundu-namyk
Gansing-khoitu
Sand Hills
Bed of Caked Salt
Hajjar Zakha
Gahun Nor
Urtyn Nor
Tarty W.
HAJJAR DISTRICT
C. Tarating
C. Hajjar
Arahanin
Khorgoin Ula
C. Jetkin
C. Bulantat
Salt Lake
Dzukha
Tsosonah Mts
Sasare Dawan P.
Torai Mts
Natchi Valley
Natchi P.
Mt Chirchik
C. Amhan
Mt Sharakul
Mt Bugutai
Aighir-bulaka P.
Koko shili Range
Plain Nur
Dungbure Range
Nadanu
Khapchik R.
Tsagan-ora Mts
Buha-magnai Mts
Mt Djama
Sheren Dzagar Ola Mts
Bashanulo
Di Chu
Ferry
Chapar
Salt L.
Mur-tasai
Lake Kashun
Salt
L. Bilichakhu
Altyn Tagh
Chamen Tagh
Cherchen R.
Kara-muran R.
Kum Kul Khri R.
Kalta Ottak R.


82
84
86
88
90
92
E S T U R K I S T A N
T A R I M B A S I N
K U R U K T A G H
K U M - T A G H S A N D S
L O B N O R L A K E
A L T Y N T A G H
C H A N G C H E N M O U N T A I N S
U N E X P L O R E D
Cherchen River
Cherchen
Tokus-Davan
Akka Tagh
Volcano
Kara-kurchin
Tumak-taul
Chukur Sai
Tash Dawan P.
Chimen Bash Kul
Kara Choka
Dundu-namyk
Mt. Jingeri
Mt. Sulamagh
Mt. Kashe-tagh
Mt. Ikhyn ganga khorga
Mt. Ikhyn gazyn khorgu
Mt. Kum-tagh
Kum Dawan P.
Kum Kul
Aiag Kum Kul
Achik Kul
Barkhalu
L. Kashun
L. Bulchakhu
Tokum
Argyun
Kirchin
Boskul
Jata Bolda
Kara Dai
Inchiki R.
Kum Arik
Kultokmit Kul
Yengi Kul
Kirgalik
Chakilik
Tatlyk-bulak Spr.
Tatran
Kara-tugrak W.
Kara-yaran
Yantak-kuduk
Akbai W.
Ketmen
Kalasi W.
Tomb of Imam Djafar Sadyk
Ruins of Old Town
Kara-kurchin
Tumak-taul
Titong
Jax-bulak
Galechan-bulak
Chaglyk-bulak
Lake Cassa
Lake Balgyn-bash
Gansing-khoitu
Ganga
Shara-gol P.
Urtya Nor
Tartya W.
Bumba
Arshan
Gahun Nor
Mandalik
Muzluk P.
Achan
Kum-dogas Spr.
Andere
Shundun W.
Khadyr-gha W.
Yar-bungur
Bilek
Yasulgun
Kerim
Awras
Shuripai
Toghuan Langar
Kopa
Polu
Yu-chilak
Kalgan-bulak Spr.
Sugel-bulak Spr.
Karu Sai
Sorgak Gold Mines
Bugana Spr.
Komish-bulak Spr.
Ak-su
Bash i Kul
Sarvk-tug P.
Kungmish Kul
Shor Kul
Aman Mula
Sulphur L.
Ulugh shah i kul
C. Aksu
C. Baba Hatun
C. Tangra Chuzak
C. Togral Ohba
Yeshil Kul
Kalung Kurlu
Iturapka
Aru Cho
Araptse
Karupke
Wide open valley
Tawak Kalda
Aghirsa
Tal-ning Aghzi
Dallah na Avalem
Kalguznung Kum
Dangi Darya
Rosa Bai Tumshuk
Gang Nong Masjid
C. Quneruda
Bash Kurla
Yedi
Uldi
Yarkhlik
Kum Arik
Chum of Tarim
Kok Chul or Ugen R.
South Channel of Tarim R.
Road to Tunan
Kuenchi Akchagh
C. Kema Sala
Kara Kul
Yerda R.
Ulugh Kul
Kargalik
Chigalik
Kuchug ata
Ayak Kul
Kuchug ata
Tatlyk Dilung
Ruins of Old Lob C.
Jaman Aklat
Chakilik
Yakub bai W.
Takar W.
Chapan-kaldy W.
Kash-shari
Tandakkak
C. Sai
C. Bulak Bashi
C. Saipuk Bulak
Kalla Kul
C. Pushalik
Gashun Nor
C. Mandalik
Lake Sali
Chong-yur
Tash Kul Bashi
Kara-chohe
Kara-Tokai
Mulli Kergham
Kum Kul Khoi
C. Kum Kul
C. Kalla Ottak
Sands
Tableland
Pass
Tengan-tokhoi Valley
C. Bokalik
C. Bulantai
Mt. Chapka Manomekh
Kara-gol P.
Kara-Tokai
Kara-Tokai P.
Manar Dilung
Kolkhan O Tagh
Kara-Tokai W.
Kara-Tokai R.
Kara-Tokai Pass
Kara-Tokai Valley
Kara-Tokai Glacier
Kara-Tokai Peak
Kara-Tokai Ridge
Kara-Tokai Plateau
Kara-Tokai Basin
Kara-Tokai Lake
Kara-Tokai Stream
Kara-Tokai Gorge
Kara-Tokai Cliffs
Kara-Tokai Slopes
Kara-Tokai Foothills
Kara-Tokai Valley
Kara-Tokai Mountains
Kara-Tokai Range
Kara-Tokai Summit
Kara-Tokai Saddle
Kara-Tokai Col
Kara-Tokai Ridge
Kara-Tokai Peak

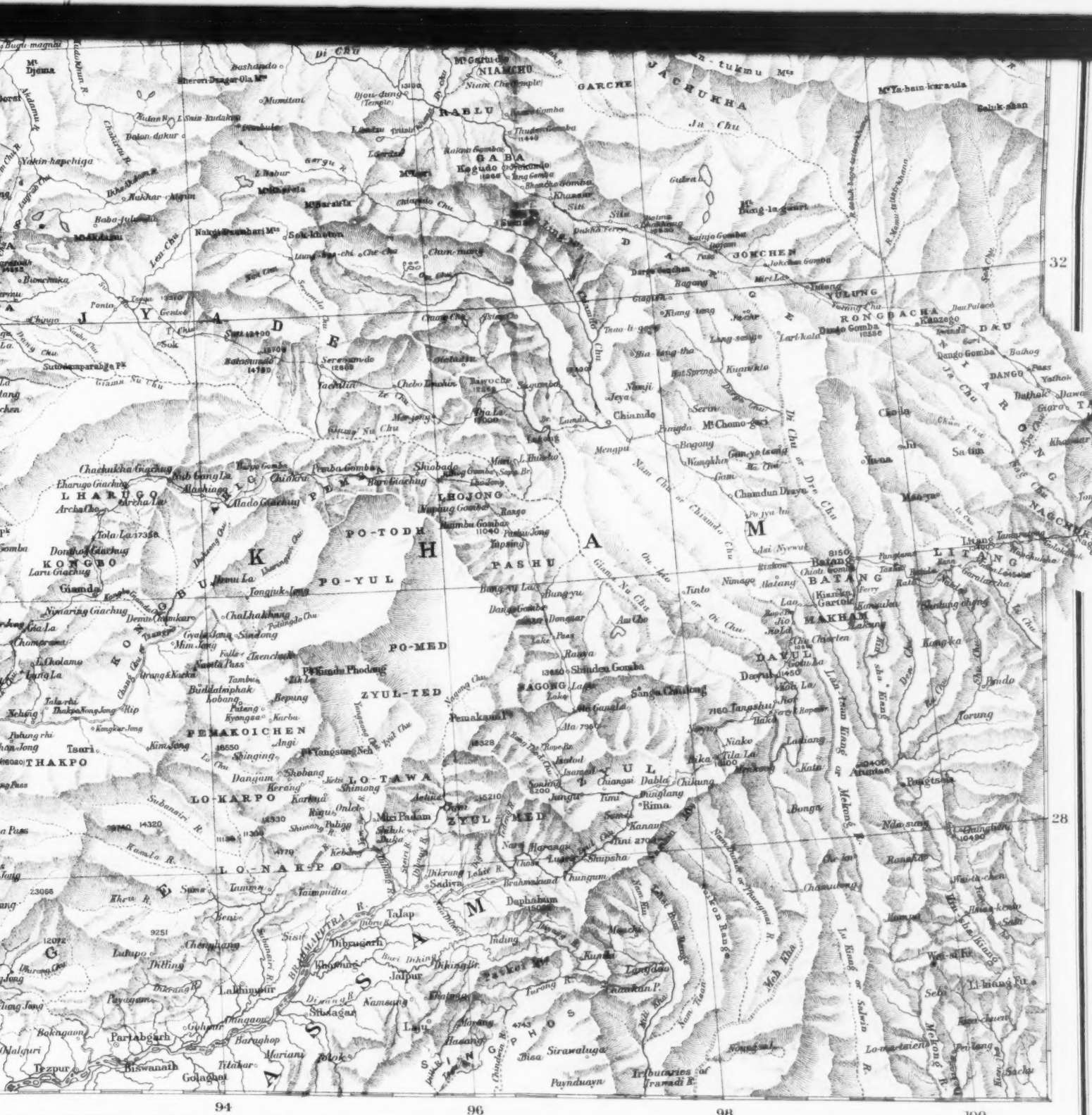

94
96
98
100
102
40
38
36
34
Sulusin Tagh
Nainshe
Nangaulu Mts
Saitu or Sachu
Syrtyn Plain
SYRTYN DISTRICT
MAKHAI DISTRICT
HAJJAR DISTRICT
Humboldt Range
NAN SHAN RANGE
ALA-SHAN
KAN-CHAU
SU-CHAU
KOKO NOR
KOKO NOR Range
Tolai Range
Shuga Range
SHANG Range
Baian-Kara-ula Range
Anneh Machin Range
BARONG
BANAKHASUM
CHIAMUGOLOK
Ho-shili Mts
Djupar Mts
Gurbu-gunzuga Mts
Baian-tukmu Mts
Arcsum
Hoast-ho
Di Chu
NIAMCHU
Syrtyn Nor
Khuthun Nor
Chaidan Tolbai Nor
Dabasun Nor
Toso Nor
Dalai dabasu
Donkyr
Duha-cheng
Shin-chang
Hsi-ning
Da-tung
Da-tung-gol
Ta-nan-cheng
Ping-an-ing
Chang-ning-hu
Shuan-cheng
Ta-tan-ma-hu
Ping-yui-da-tsuan
Sha-tsao-ko
Veh-chung
Yon-tsu
Gu-khun
Tsai-ho-tsing
Keh-to-tsing
Sing-tsing
Khakh-bulak
L. Alak-chi
L. Khua-khaitsi (Alak)
Ba-Tinza R. Ho
Da-chuan-tsi
Toli
Hong-Lu-Yin R. Ho
Ching-sheng-ko L.
Bulundun
Undulating Plain
Yui-min-baien
Ti-ma-ta
Chi-chung-ku
Mc Dai-shan
Mc Kheh-tsan-shan
Mc Kheh-li-shan
Mc Beh-ta-shan
Mc Moo-shan
Mc Kei-udan-shan
Mc Tsung
Mc Konkyr
Mc Kara-sai
Mc Ulen
Mc Ame-baien
Mc Kargi-ula
Mc Che-ula
Mc Sugutai
Mc Gartu-dje
Mc Shara-ul
Mc Usyukeh
Mc Ulan-ula
Mc Ulan-ula
Mc Ulan-ula


TIBET
AND
THE SURROUNDING REGIONS
Compiled from the latest information
Scales.
69 Miles = 1 Degree
104.3 Versts = 1 Degree
Natural Scale 1: 3,800,000
Explanation of Tibetan and Mongolian Names
Botak . . Spring
Cho . . . . Lake
Chu . . . . River
Daban . . . Pass
Gol . . . . Stream
Gomba . . . . Monastery
Jong . . . . . Fort
Kul . . . . . Lake
Kurghan Enclosure
La . . . . . Pass
Mauren . . River
Nor . . . Lake
Tagh . Mountains
Ula . Mountains
Usu . . . . River
C. Camp L. Lake P. Pass R. River W. Well
TIBET PROPER
KACHIN PROVINCE
DOKTHOL PROVINCE
MAJIN
Many Borax fields
Kailas Peaks
Mansarowar Lakes
Rakas Tal
Tso Mapham
Gurla Mandhata
Himalaya Mts
Nanda Devi
Dhaulagiri
Mt Everest
Kanchinjunga
Brahmaputra or Matchang Tsanpo
Sutlej R
Indus R
Karnali R
Gogra R
Kosi R
Arun R
Tsangpo R
Pangong Lake
Rudok
Sajum
Demchok
Hanle
Chumar
Leh
Gartok
Jiachan
Toding
Chokola
Taklakhar
Almora
Ranikhet
Naini Tal
Bareilly
Pilibhit
Miranpur
Dhaurahra
Bahraich
Gonda
Fyzabad
Ajodhya
Sultanpur
Partabgarh
Allahabad
Benares
Jaunpur
Ghazipur
Buxar
Patna
Gaya
Monghyr
Bhagalpur
Purnea
Darjeeling
Titalya
Jalpaiguri
Rangpur
Gowalpara
Goalpara
Gauhati
Tezpur
Lakhimpur
Sadiya
Dibrugarh
Jorhat
Sibsagar
Nowgong
Shillong
Cherrapunji
Dacca
Mymensingh
Sylhet
Chittagong
Akyab
Arakan
Pegu
Rangoon
Prome
Thayetmyo
Henzada
Bassein
Tharrawaddy
Toungoo
Mandalay
Amarapura
Ava
Sagaing
Monywa
Shwebo
Katha
Bhamo
Myitkyina
Sadon
Hukaung Valley
Upper Irrawaddy
Upper Chindwin
Kubo Valley
Hukong Valley
Patkoi Range
Naga Hills
Manipur
Cachar
Lushai Hills
Chittagong Hill Tracts
Arakan Yoma
Pegu Yoma
Shan States
Kengtung
Zimme
Lakon
Nan
Luang Prabang
Tonkin
Hanoi
Haiphong
Gulf of Tonkin
Hainan
Yunnan
Kwangsi
Kwangtung
Hong Kong
Canton
Macao
Swatow
Amoy
Foochow
Wenchow
Ningpo
Shanghai
Hangchow
Nanking
Chinkiang
Yangtsze Kiang
Hwang Ho
Peking
Tientsin
Shantung
Kiaochow
Weihaiwei
Port Arthur
Talienwan
Newchwang
Yalu R
Korea
Fusan
Gensan
Vladivostok
Nagasaki
Kobe
Osaka
Yokohama
Tokio
Japan
Formosa
Taihoku
Philippine Islands
Manila
Luzon
Mindanao
Sulu Archipelago
Borneo
Kuching
Sarawak
Brunei
Labuan
Jesselton
Sandakan
Celebes
Macassar
Java
Batavia
Sumatra
Singapore
Malacca
Penang
Andaman Islands
Port Blair
Nicobar Islands
Ceylon
Colombo
Kandy
Trincomalee
Jaffna
Pamban
Madura
Tuticorin
Cape Comorin
Travancore
Cochin
Calicut
Mangalore
Goa
Bombay
Surat
Ahmedabad
Cambay
Gulf of Cambay
Kathiawar
Gulf of Kutch
Kutch
Cutch
Sind
Karachi
Hyderabad
Jodhpur
Jaisalmer
Bikaner
Ajmere
Jaipur
Alwar
Delhi
Agra
Gwalior
Indore
Nagpur
Chanda
Berar
Khandesh
Aurangabad
Poona
Satara
Belgaum
Dharwar
Bellary
Cuddapah
Nellore
Madras
Pondicherry
Vellore
Salem
Coimbatore
Trichinopoly
Tanjore
Negapatam
Karikal
Mysore
Seringapatam
Bangalore
Hyderabad
Secunderabad
Warangal
Kistna R
Godavari R
Nerbudda R
Tapti R
Mahanadi R
Brahmani R
Baitarani R
Subarnarekha R
Damodar R
Hugli R
Ganges R
Jumna R
Chambal R
Betwa R
Ken R
Son R
Sone R
Gandak R
Kosi R
Ghaghara R
Gumti R
Rapti R
Gogra R
Sarda R
Kali R
Ramganga R
Bhagirathi R
Alaknanda R
Dhauli R
Kali R
Gori R
Sarju R
Pindar R
Nandakini R
Mandakini R
Bhilangna R
Bhagirathi R
Jahnavi R
Tehri
Srinagar
Rishikesh
Hardwar
Meerut
Muttra
Aligarh
Etawah
Cawnpore
Lucknow
Unao
Rae Bareli
Fatehpur
Banda
Hamirpur
Jhansi
Gwalior
Dholpur
Bharatpur
Alwar
Rewari
Hissar
Bhatinda
Ferozepore
Lahore
Amritsar
Gurdaspur
Jammu
Kashmir
Srinagar
Baramula
Gilgit
Hunza
Nagar
Skardo
Baltistan
Ladakh
Leh
Rupshu
Zanskar
Suru R
Dras R
Shyok R
Nubra R
Indus R
Zaskar R
Kishtwar
Chamba
Kangra
Simla
Kulu
Lahul
Spiti
Kunawar
Garhwal
Kumaon
Nepal
Katmandu
Patan
Bhatgaon
Pokhra
Gorkha
Palpa
Butwal
Bhairawa
Nepalganj
Dang
Surkhet
Jumla
Dullu
Dailekh
Doti
Sirmur
Sahaswan
Shahjahanpur
Bareilly
Moradabad
Rampur
Bijnor
Saharanpur
Ambala
Karnal
Panipat
Rohtak
Gurgaon
Rewari
Narnaul
Jhajjar
Bhiwani
Hansi
Sirsa
Fatehabad
Ferozepore
Ludhiana
Jullundur
Hoshiarpur
Kapurthala
Amritsar
Gurdaspur
Pathankot
Jammu
Akhnur
Rajauri
Poonch
Kishtwar
Bhadarwah


B
L
Buha-magna M.
Mt. Djoma
Mt. Gurla-dha
NIAMCHU
GARCHE
JACHU
RABLU
GABA
Kegudo
Gurban-bakh
Basudun-Illa
Yakin-hapchiga
Atag-hapchiga
Kachi-ulan-muren
Snowy Range
Dangla
AMDO
YAGRA
NAMRU
NAGCHUKHA
JAMA
Mt. Namchang tang-lo
Mt. Samtyn-kansyr
SHANGSHUNG
TENGRI NOR
Nim Chen Tangla Pk.
Khalamba Pass
Baknak Do.
Khocha
Rehung Gomba
Phondu
Baknak Pass
Chak Pass
Dhejen Jongo
Yunnjuk Zingye
Khambo chilue
Lhasa
Namling Jong
Dongdot Jong
Brahmaputra or Yaru Tsanpo
Shigatze
Penam Jong
Kyungka
Gyalting La
Marm
Sakya
Gyang tse Jong
Dumut Tso
Pongong La
Tong-sher Jong
Lama Lai
Tso mutel thung
Khambu Jong
Tsula pangka
Kulhakangri
Donka La
Lingshi La
Chamalserin
Punakha
Bumthang Jong
Tashigang Jong
Daranga Jong
Darjeeling
Baraicha
Bishkarang
Titalia
Jalpaiguri
Mayanguri
Buxa Duar
Mahakalguri
Rampur
Silli
Tanbulpur
Nis Bagh Duar
Singribari
Dewangiri
Biokha
Tongala
Kurugonba
Amra Tola
Bakangaon
Malguri
Tezpur
Buswanath
Golaghat
Titabar
Mariani
Jorhat
Partabgarh
Gulpur
Barughop
Changaon
Lakhimpur
Dibrugarh
Jaipur
Sibsagar
Namsang
Sirawaluga
Tributaries of Irawadi R.
Puynduayn
Mishmi Hills
Abor Hills
Daphabum
Mt. Kangto
Mt. Gyala Peri
Mt. Chomo Lhari
Mt. Kula Kangri
Mt. Tsering Dagar Ola
Mt. Kang-ri-karpo
Mt. Targo Gangri
Mt. Kailas
Mt. Gurla Mandhata
Mt. Everest
Mt. Kanchinjunga
Mt. Dhaulagiri
Mt. Nanga Parbat
Mt. Godwin Austen
Mt. Kamet
Mt. Nanda Devi
Mt. Trisul
Mt. Gauri Sankar
Mt. Dhaibun
Mt. Api
Mt. Saltoro
Mt. Rakaposhi
Mt. Haramukh
Mt. Nun Kun
Mt. Kolahoi
Mt. Nanga Parbat


DOKTHOL PROVINCE
UTSANG
KACHI
HOR PROVINCE
SHANKOR
MAJIN
Borax fields
NAMRU
NAGCHURKA
SHANGSHUNG
TENGRI NOR
LHASA
YAMDOK TSO or LAKE PALTI
AMDO
Explanation of Tibetan and Mongolian Names
Bulak . . Spring Gomba . . . . Monastery Muren . . River
Cho . . . . Lake Jong . . . . . Fort Nor . . . Lake
Chu . . . . River Kul . . . . . Lake Tagh . Mountains
Daban . . Pass Kurghan Enclosure Fort Ula . . Mountains
Gol . . . . Stream La . . . . . Pass Usu . . . . River
C. Camp L. Lake P. Pass R. River W. Well
84
86
90
92

Published by the Royal Geographical Society


NIAMCHU
GARCHE
RABLU
GABA
JACHUKHA
JOMCHEN
YULUNG
RONGDACHA
DAU
DANGO
TAU
MAN
LITANG
BATANG
MAKHAM
DAYUL
LHAROO
LHOJONG
PASHU
PO-TODH
PO-YUL
PO-MED
ZYUL-TED
ZYUL MED
PEMAKOICHEN
THAKPO
LO-TAWA
LO-KARPO
LO-NAR-PO
KONGBO
GIAMDA
JYADE
Di Chu
Ju Chu
Dre Chu or Chiandu Chu
Nam Chu or Chiandu Chu
Ong-kio
Ong Chu
Lasa Yaan Kiang or Mekong R.
Mekong R.
Salwin R.
Irrawadi R.
Tsangpo R.
Brahmaputra R.
Dihong R.
Dibong R.
Lohit R.
Sisir R.
Subansiri R.
Kamla R.
Dikrang R.
Dikhu R.
Namsang R.
Singphos
Assam
Mishmee Hills
Abor Hills
Patkoi Range
Mishmee Range
Kubo
Talap
Daphabum
Sadiya
Jaipur
Lakhimpur
Dibrugarh
Sibsagar
Jorhat
Golaghat
Biswanath
Tezpur
Partabgarh
Baraghop
Mariani
Titabar
Laju
Hasang
Sirawaluga
Tisa
Paynduayn
Tributaries of Irrawadi R.
Darchendo or Ta Chen lo
Nagchukha
Lagonkha
Lagonkha
Mekong R.
Lo-ma-tsien
Pen-tang
Sacka
Wa-ssi Fit
Li-kiang Fit
Seba
Ronalip
Chamutong
Ka-la-chen
Ka-la-kenko
Sain
Ka-la-kiang
Ka-la-kiang R.
Nda-siang
Bonga
Kata
Aruntse
Pongtsola
Lorung
Pendo
Kang-ka
Lan-tsan Kiang or Mekong R.
Nu Chu
Giama Nu Chu
Ou-kio
Ou Chu
Tinto or Ou Chu
Au Cho
Mengpu
Chiando
Seriv
Jeya
Nanji
Pangda
Bagong
Wangkha
Gam
Chamdun Dzaya
Jsena
Satin
Cheila
Lang-tsang
Kuanwkio
Hot Springs
Bia-lang-tha
Thao-li-gong
Giagi
Kang-tsang
Kachar
Lari-kata
Dango Gomba
Dango Gomba
Kanzego
Dau Palace
Yathok
Bathok
Jhawa
Giaro
Bathog
Pass
Yathok
Khamsar
Shao
Pass
Jombedun
Sama La
Chatsa
Litang
Tamaroo
Litang
Pangtama
Taksa
Bassa
Kiunko
Gartok
Ferry
Rail
Nimago
Halang
Rio
Rola
Lan
Kamsulen
Rendung chung
Pendo
Torung